

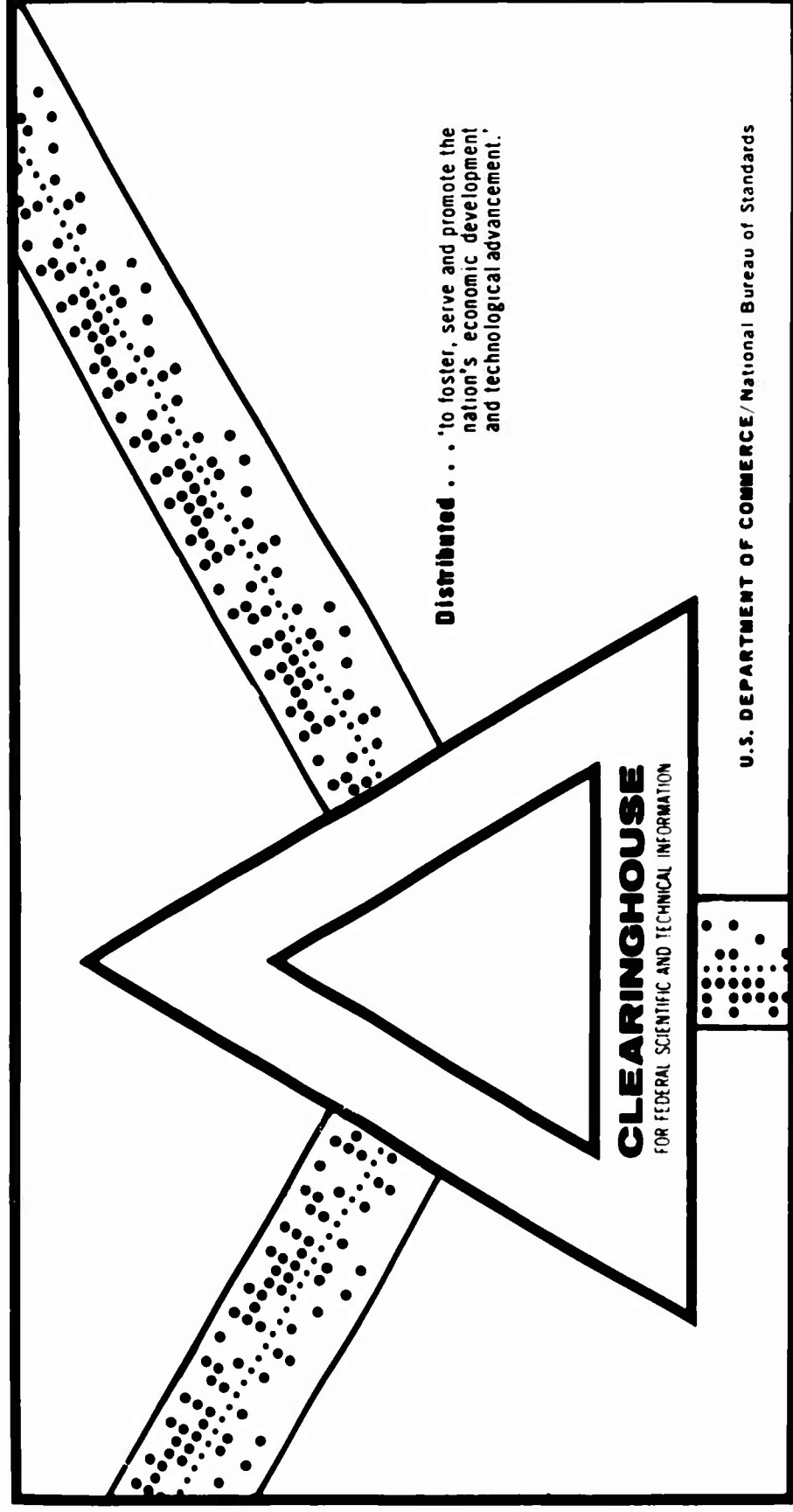
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EMERGENCY ACTIONS AND DISASTER REACTIONS: AN ANALYSIS OF THE
ANCHORAGE PUBLIC WORKS DEPARTMENT IN THE 1964 ALASKAN EARTH-
QUAKE

David S. Adams

Ohio State University
Columbus, Ohio

August 1969



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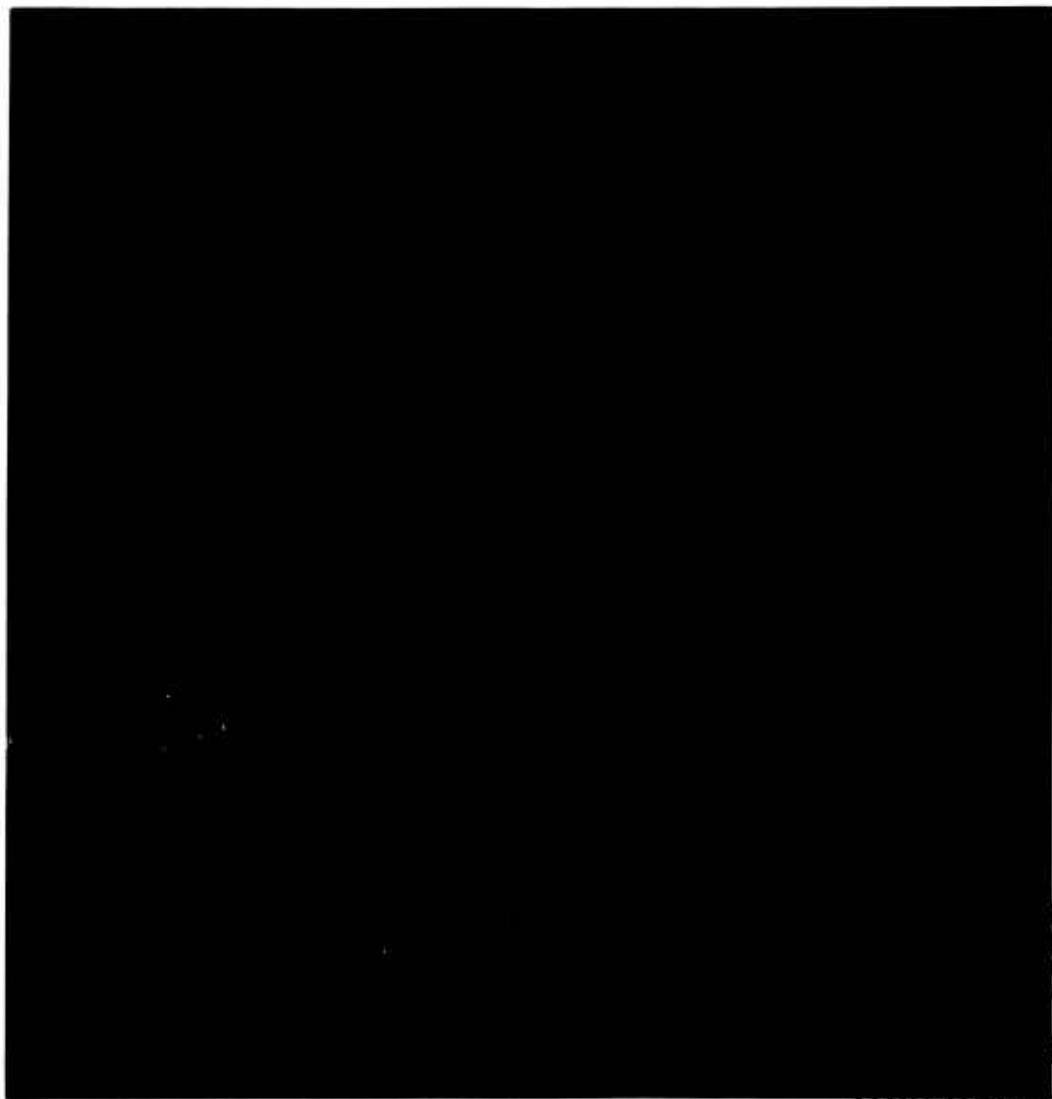
DISASTER RESEARCH CENTER SERIES

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DAVID S. ADAMS

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**Disaster Research Center Monograph Series
Number 5**

**EMERGENCY ACTIONS AND DISASTER REACTIONS:
AN ANALYSIS OF THE ANCHORAGE PUBLIC WORKS DEPARTMENT
IN THE 1964 ALASKAN EARTHQUAKE**

by

**David S. Adams
Ohio Northern University**

for

**Office of Civil Defense
Office of the Secretary of the Army
Washington, D.C. 20310**

August, 1969

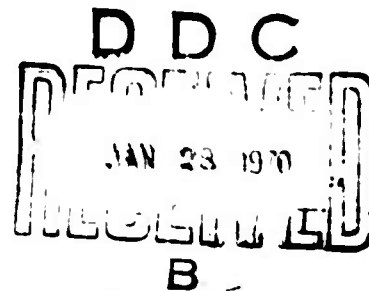
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ABSTRACT

On March 27, 1964 Anchorage, Alaska was struck by the strongest recorded earthquake experienced in North America. Widespread and extensive damage was sustained by the city during the four to seven minute earthquake. Four major slides occurred in the city: three in the downtown area, one in a suburban residential section. Buildings and streets were damaged and essential water and sewer services disrupted. Within twenty-seven hours of the earthquake's impact a Disaster Research Center field team was dispatched to Anchorage to begin a study of the response of various community organizations to the disaster, a study which required six separate field trips and was concluded in the fall of 1965. A major part of this longitudinal study concerned the disaster responses of the Anchorage Public Works Department, the municipal agency most involved in meeting the emergency demands of the earthquake. Some sixty in-depth interviews were conducted with members of this department concerning their activities during "normal" times as well as during the earthquake emergency period. This monograph is a summary and analysis of this interview data. Additional written material supplements this data.

The analysis employs two analytical schemes developed at DRC. One provides a framework for comparing organizational behavior during "normal" (Time One) and emergency (Time Two) operations. The other scheme distinguishes among four types of organizations, comparing them by their structure and tasks. The analysis suggests that the behavior of members of the Anchorage Public Works Department during Time Two may usefully be characterized as emergency actions and disaster reactions. Members of maintenance divisions of the public works acted in terms of their standard emergency procedures; members of engineering divisions, on the other hand, reacted to a unique and discontinuous event. They were required to improvise much of their response to the disaster, this improvisation being most clearly demonstrated in the Time Two emergence of a new engineering group within the public works department. The distribution of Time Two operational problems in tasks, authority, decision making, and communications are related to this distinction between emergency actions and disaster reactions.

FOREWORD

This document is one of a series of publications prepared by the staff of the Disaster Research Center, The Ohio State University. This aspect of the work of the Center has been sponsored by the Office of Civil Defense under Contract OCD-PS-64-46 Work Unit 2651-A. Below is a listing of the materials which have been included in the monograph and the report series.

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The Police Department in Disaster Operations

The Fire Department in Disaster Operations

The Functioning of Civil Defense in Community Disasters

Salvation Army Activity in Disasters

The Local American Red Cross: Programs, Policies and Problems

The Los Angeles Fire Department Operations During Watts

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PREFACE

Everett Hughes once observed that it might appear to outsiders that sociologists chose some of their subject matter on the basis of the status of the object they studied. At least it seemed to explain why many low-status jobs and work organizations were largely ignored compared with the relatively greater scholarly attention given to high-status activities. Whatever the reason, it is true that there are major lacunae in sociological descriptions and analyses of many of the most common but less prestigious community organizations. This monograph starts to fill in one of these gaps, focusing as it does on a municipal public works department.

Besides presenting a sociologically informed view of such an organization during normal times -- very probably the first such study of its kind -- the author also depicts the operation of this kind of complex organization under stress conditions. To be sure, what he presents is but a case study of a single organization, yet his presentation goes beyond mere description. While his notion of viewing complex organization as confederations of rather different groups certainly does not apply to all large organizations, it is a provocative idea and merits examination in other contexts. In this particular instance, the multi-nature of the public works department clearly resulted in differential responses to the stress condition in which it had to operate.

This monograph is one of a series of continuing publications, initiated by the Disaster Research Center. Some monographs in the series will deal with different aspects of the Alaskan earthquake, and others on different issues and disaster events. These monographs are written with several audiences in mind. One of these audiences is composed of social science professionals. Another is composed of persons responsible for the functioning of organizations. Hopefully, others with no professional or occupational motives will also be interested. With such a diverse audience, it is possible that the final product will satisfy no one. For some, the monograph may be too abstract and theoretical; for others, they may be too detailed and practical. It is hoped, however, that they will have some value for all. This monograph, as well as several others in the series, was written on a project supported by the Office of Civil Defense, OCD-PS-64-46, Work Unit 2651-A. We are appreciative of this support.

E. L. Quarantelli
Russell R. Dynes
Co-Directors
Disaster Research Center

ACKNOWLEDGMENTS

Acknowledgment for invaluable assistance in the preparation of this monograph is hereby made to the following persons:

First, of course, the members of the Anchorage Public Works Department for demonstrating their belief in the usefulness of the DRC's work;

Dr. William A. Anderson, Dr. Daniel Yutzy, and the late Dr. James Hundley, members of the DRC Alaskan field team, for conducting all the public works interviews;

Marilyn Acton, Beverly Alpert, Bonnie Bell, Karen Clausen, Grace Dean, Melzia Flowers, Kathy Griffin, Marge Healy, Becky Love, Mary Morris, Sue Razor, Marilyn Sears, Ruth Ellen Smith, and Valarie Vanaman for transcribing all those interviews;

Drs. Anderson and Yutzy for clarifying Anchorage information otherwise confusing to one who had never been there and for providing moral support during the writing of this monograph;

Joyce Cross, Kay Leonard, June Reed, and Marilyn Sears for transforming a maze of typescript, arrows, asterisks, and scotch tape into a readable draft;

Dr. E. L. Quarantelli for substantive suggests and editorial supervision; and Jean-Claire Böhm, Evelyn Davidson, Diane Dixon, Margaret Harris, Kathy Kirkpatrick, Carla Morris, Beverly Parmer, Marilyn Patrick, Janet Patterson, Judy Smallwood, Barbara Tootle, and Janice Yug for typing and proofreading the final copy.

Although this monograph would have been impossible to write without the kind offices of all these persons, it would have been impossible without me too. And it is upon me that the final responsibility falls; no one else can be held accountable.

David S. Adams

CHAPTER I

INTRODUCTION AND OVERVIEW

Introduction

This monograph has two purposes. The first, and more obvious of these, is to describe the response of one organization to a disaster. The Anchorage Public Works Department was one of several public agencies involved in the emergency operations which followed the March 27, 1964, earthquake in Alaska. Responsible for the maintenance of public streets and for the sewer and water systems of Anchorage, as well as for the engineering tasks associated with these municipal systems, the public works was as important as any other organization in facilitating the recovery of the community from the effects of the disaster. Indeed, given the range of the public works' emergency activities, it was perhaps the most important single municipal organization in this recovery.

In addition to providing case study material, this monograph incorporates two theoretical approaches or formulations relevant to the understanding of organizations in disasters. Both of these were developed at the Disaster Research Center (DRC) and were the result of extensive analysis of existing literature, as well as of organizational data collected by the Center's field teams and from its laboratory experiments and simulations. What follows in succeeding chapters cannot be construed as a test of the propositions in either approach; one of the necessary limits of the case study is, in fact, that it normally cannot test hypotheses. Rather, this monograph employs these theoretical approaches to organizational behavior in an attempt to suggest their uses and limitations. This is the second purpose of the monograph.

This first chapter introduces and defines a number of terms which derive from these two formulations. The descriptive and analytical content of the chapters after this one have been structured by these terms. However, a more complete discussion of the two formulations is reserved for the final chapter of this monograph. In that chapter the expectations which the theoretical approaches generate are illustrated, more or less successfully, by what appears to be the major characteristics of a public works department in a disaster situation. The overall organization of this monograph was dictated by the assumption that it was, first of all, description. Theoretical considerations were defined as secondary in this context.

In several papers written by Haas, Drabek, Quarantelli, and other DRC staff members, a conceptual and theoretical scheme for the analysis of organizational behavior in both "normal" and extreme environments has been elaborated.¹ Several of the concepts which are a part of this scheme have been employed in a somewhat simplified form in this monograph. The most basic of these is the distinction between Time One and Time Two. These terms refer, respectively, to "normal" times and to "emergency" or "disaster" periods. (A distinction between emergency and disaster is suggested later in this

monograph.) The crucial variable in making this distinction is stress, a condition which itself is an index of an imbalance between the demands made on an organization and the capability of that organization in satisfying those demands. Stress and the ratio between demands and capability are discussed more completely in the final chapter. For purposes of the descriptive analysis which follows, the normal-emergency distinction is sufficient.

A number of additional concepts have been employed in the description of organizational behavior, during both Time One and Two. These concepts also derive from the papers indicated above. Somewhat more broadly than in their initial usage, the distinction between performance structure (or tasks) and normative structure (or authority) are incorporated in the following chapters. Tasks, in the context of these chapters, refers simply to the activities of members of the organization -- to the things which they do as members of the organization. To the extent that these activities are recurrent, the notion of performance structure as formulated by Haas is implied.

Similarly, the term normative structure is incorporated in the idea authority, especially when reference is made to patterned deference relationships among members of the organization. These patterns may be said to be the result of social norms, which ". . . operating through the participants, led to produce the patterning which has been observed."¹² Further, the idea of authority, in the general sense of the capacity to determine the activities of others, is illustrated by certain terms which are less abstract and refer specifically to overt behavior. "Decision making" and "chain of command" (lines of authority) are two such terms. Decision making has been employed to designate responses to the question, "Who decided that such-and-such should be done?" and chain of command has reference to the communication of these decisions, i.e., "Who told you that such-and-such should be done?"

The adjectives official and unofficial are also employed in the description and analysis that follows. These terms have been attached most frequently to the notions of tasks and authority. In any complex organization, there are certain positions whose occupants, because they hold these positions, are responsible for initiating procedural norms and/or making changes in existing norms. This responsibility may be called official insofar as it adheres in the position itself rather than in the individual who occupies the position. Unofficial norms -- which likewise pertain to organizational tasks or authority relationships -- are those which originate with individuals who do not occupy organizational positions possessing this authority. This does not, of course, eliminate the possibility that norms which were unofficial may become official when recognized as useful or legitimate by the occupants of authority positions.

Several DRC papers by Quarantelli, Dynes, Brouillette, and others present a typology of involvement among organizations in disaster situations.³ This typology has been extended to serve as the basis for certain

functional distinctions within one organization, in this case, the Anchorage Public Works Department. Four organizational types are developed in Quarantelli's original paper by contrasting established with emergent organizations, and regular with nonregular tasks in a disaster environment. Basically the same comparisons have been employed in the description and analysis of the divisions and sections within the department. Maintenance groups, for example, are contrasted with engineering sections, the distinction being that during the emergency, existing maintenance units performed their "regular" tasks while existing engineering groups performed largely "nonregular" tasks. In addition, one section within the engineering division of the public works expanded its personnel and altered its tasks to the extent that it became a new organization altogether. This illustrates what Quarantelli in his statement called Type IV organizations, emergent groups which perform nonregular tasks.⁴

The various theoretical formulations provide concepts which have been useful in structuring the bulk of this monograph. Again, however, the monograph should not be read as an attempt to test any hypotheses. It remains a case study and, as such, primarily descriptive although an attempt is made to assess the advantages and limitations of both formulations.

Overview of the Monograph

Chapter two characterizes the community setting of the Anchorage Public Works Department. The structure of the city government and the location of the department within that framework, as well as some remarks on the "spirit of Anchorage," are included. The second part of the chapter describes the earthquake itself, and briefly notes the extent and nature of the damages which followed the disaster, with emphasis on those which had particular pertinence for the operation of the public works organization.

A description of the normal, Time One operations and structure of the department are given in chapter three. In this discussion the official distinction among the various divisions and sections of the organization are followed, although wherever unofficial relationships overlap these boundaries they are noted. The data included in this chapter provide the basis for isolating the changes which occurred during the emergency (Time Two).

Chapters four and five consider Time Two. Chapter four describes the tasks which the engineering, the maintenance, and the service and administrative personnel undertook. Chapter five continues this discussion with a presentation of the changes (or the continuities) in authority patterns in these groups after the earthquake. Thus, chapters three, four and five constitute the discussion of official and unofficial tasks and authority in Time One and Time Two. Chapter two introduces certain interesting variables which affected, either positively or negatively, the capability of the public works to satisfy the emergency demands. In addition, chapter two suggests something of the nature of the community demands which the public works was required to meet during both Time One and Time Two.

Descriptive material in these chapters is also organized, somewhat roughly, around the aforementioned typology. Thus, in chapters three and five, personnel of the public works are generally categorized as maintenance (existing groups with regular tasks) and engineering (existing groups with nonregular tasks). In addition, consideration is given to organizational personnel, primarily in service and administration, who do not appear to fall within the typology as neatly as do the other two. Descriptive data concerning the emergent group with nonregular tasks that appeared in public works are provided in chapters four and five, but again under the "engineering" rubric.

The final chapter of this monograph is devoted to a reconsideration of the data, to certain major themes which appear again and again in the descriptions, and to a discussion of these themes in terms of the two theoretical formulations introduced in this first chapter.

Methodological Note

The interviews on which this monograph is largely based were conducted in Anchorage, Alaska, by members of the DRC staff. The process of interviewing began within twenty-seven hours following the earthquake in 1964, and was continued through a total of six trips, the last of which took place in September, 1965. Approximately sixty separate interviews were conducted with members of the Anchorage Public Works Department, although some employees were interviewed as many as three or four times. These in-depth interviews typically lasted two hours; some, however, extended for upwards of five hours. All were tape recorded and subsequently transcribed.

An attempt was made to interview all personnel in positions of foreman or higher. With only two exceptions, this attempt was successful. Thus, approximately one-half of the interview data was provided by supervisory personnel. Additional interviews were conducted with other public works employees, the general approach being to sample every fifth member of each division and section in the total organization. Twenty-four members of the department were interviewed in this way. Twenty-five supervisors were interviewed in the 100 percent sample of those personnel. Only supervisory personnel were reinterviewed.

In the writing of this monograph, the data contained in these interviews were supplemented by additional information from a variety of written sources. The annual budgets of the city of Anchorage, minutes of meetings held during the emergency, field notes of DRC personnel, and similar documents provided substantial support for parts of this monograph. Published documents are, of course, footnoted; information derived from unpublished material or from sources other than the recorded interviews is documented in the text.

FOOTNOTES: Chapter I

1. Some of this particular theoretical formulation originates in J. Eugene Haas, Role Conception and Group Consensus (Columbus: Bureau of Business Research, The Ohio State University, 1964). It is developed with reference to complex organizations and disaster situations in two papers: J. Eugene Haas and E. L. Quarantelli, "Organizations Under Stress: Towards a Theoretical Explanation of Variation in Response" (Columbus: Disaster Research Center, The Ohio State University, 1964); and Thomas E. Drabek, J. Eugene Haas, E. L. Quarantelli and Russell R. Dynes, "Research in Organizational Stress Theory," to be published in the National Institute of Social and Behavioral Science Symposia Studies Series. Findings from an experimental testing of some propositions in the formulation are analyzed in Thomas E. Drabek, Laboratory Simulation of a Police Communication System Under Stress, Disaster Research Center Monograph Series (Columbus: College of Administrative Science, The Ohio State University, 1969).
2. Haas, Role Conception, p. 26.
3. E. L. Quarantelli, "Organization Under Stress," Symposium on Emergency Operations, ed. by Robert C. Britson (Santa Monica: System Development Corporation, 1966), pp. 3-19; Russell R. Dynes, Organized Behavior in Disaster: Analysis and Conceptualization, Disaster Research Center Monograph Series (Columbus: Disaster Research Center, The Ohio State University, 1969); and John R. Brouillette, "The Bureaucratic Model of Organizational Analysis: Its Limits and an Alternative Position," a paper delivered at The Ohio Valley Sociological Society meetings, Notre Dame University, South Bend, Indiana, April 26, 1967. (Typewritten.)
4. Quarantelli, "Organization Under Stress," p. 5.

CHAPTER II

THE COMMUNITY ENVIRONMENT AND THE DISASTER

Any attempt to understand the activities of either individuals or groups must draw certain boundaries, arbitrarily perhaps, but necessary nonetheless if the explanation is not to be as unwieldy and diffuse as the thing itself. Thus, this study of the Anchorage public works has excluded much that is tangential to the organization and its personnel but which would be required were a total understanding possible. There are, however, a number of situational factors which must at least be hinted at if the organization's reactions to the disaster are to be appreciated. To these factors this chapter is devoted.

Two separate sets of situational factors are included in this chapter. The first set, those of the community, includes the relevant climatic, geographical, and social characteristics of Anchorage which appear to have affected the capacity of the public works organization to respond to the earthquake.¹ The second set of factors discussed includes the earthquake itself, the timing of the disaster, the extent of the damage which it caused, and the nature of the destruction, especially as it involved buildings, streets, and utilities for which the public works department is responsible.

Community Environment

Climate and Seasonality

Anchorage is located on the south-central coast of Alaska, almost at the head of Cook Inlet, a large natural bay which empties into the Gulf of Alaska. The city is situated on a broad, undulating glacial plain, roughly triangular in shape, bounded on the northwest by the Knik Arm of the inlet and on the southwest by the Turnagain Arm. On the eastern side of the triangle, Anchorage is bounded by the Chugach Mountains. Between the mountains and Anchorage itself, which is presently concentrated close to the Knik Arm of Cook Inlet, the growth of the city is checked by two military installations: Fort Richardson and Elmendorf Air Force Base. Thus, the suburban perimeter of the city is moving south, toward and along the Turnagain Arm of the inlet.

Compared with other areas of Alaska, Anchorage enjoys a moderate climate, with neither extremes in rainfall or temperature. Its average annual precipitation of fourteen inches is the result of its location behind the Kenai Mountains, a range which lies along the south-central coast of Alaska. The warm and moist winds which prevail from the Pacific are "wrung out" by these mountains before they reach Anchorage, leaving behind more than one hundred inches of rain annually in some areas. Unlike interior regions of Alaska which are subject to extremes of temperature -- from as low as 78° below zero to summer temperatures in the nineties -- Anchorage temperatures are moderated by the Pacific winds. Summers are comparatively cool with average temperatures ranging in the middle fifties and winters are mild,

average temperatures falling in the thirties. The spring thaw, one of the "normal emergencies" which affect members of the public works, occurs during April; winter freezing normally begins again in October. The result is a relatively short warm season of some five or six months, a climatic feature which limits the operations of certain business enterprises, especially the construction and fishing industries.

Indeed, this seasonality is one of the principal characteristics of the Alaskan economic system. Since it is a direct result of the climate of the region, this seasonality is immune to political action. Programs for change can be focused only on the social consequences of these climatic limitations as, for example, the disrupting variations in employment between summer and winter.² This variation requires either an in-migration of workers during the summer months or an extended period of unemployment for permanent residents of the area during the winter months. In a Department of Commerce report, Graham makes the following analysis of the effects of seasonal variations on the labor force of the entire state.

Rough approximations, for which statistical measures are lacking, indicate that in recent years /the 1950's/ the employed labor force at its seasonal high is from two-fifths to one-half larger than at its seasonal low. This means that some 30,000 to 40,000 persons are idle during a part of the year or that a considerable number of workmen must be brought into the State on a temporary basis in order to meet seasonal labor requirements. It appears that a combination of the two alternatives is used. About one-third of the requisite pool of seasonal employees is made up of temporary, non-resident workers. As much as an additional one-fourth of this "surplus" labor pool appears to consist of fulltime residents of the state who are, except for seasonal work, unemployed.³

Like private businesses in construction work, the public works department of Anchorage periodically expands its labor pool to accommodate the increased building of the summer months. Particularly true of the general maintenance section of the maintenance division, this expansion creates certain problems which continue to resist solution. To the extent that the temporary employees are new to the system, there is a necessary period of education during which the new men must rely on their permanent co-workers' knowledge and experience. This reduction in efficiency is complicated if friction develops between the permanent and the temporary employees. No evidence is available which suggests whether the same temporary workers return to the same positions each year, but an informal estimate of the yearly employee turnover in the organization places it at something like 20 percent. Such a variation in employees clearly creates expensive problems in training and continuity. Under these conditions, permanent help becomes valuable: the "old-timer" becomes an essential source of information and a highly useful, although often unofficial, supervisor.

Population

The transient nature of the population is not limited to the civilian employees of Alaskan industry and community departments. Anchorage in particular is largely dependent on the presence of federal military installations for employment and general economic stability. Indeed, Anchorage -- in terms of its economic and "cultural" expansion during the 1940's and 1950's -- is something of a creation of the federal military departments. The presence of Fort Richardson and Elmendorf Air Force Base is to this extent a blessing; it is, however, a mixed blessing since the bases add significantly to the transiency of the city's population. The majority of those military personnel who are assigned to Anchorage (and to Alaska), despite present encouragements to bring their families with them, apparently see their residence there only as temporary. A certain reluctance exists on their part to be as active in the political and social affairs of the community as more permanent residents might be. Children of military personnel may be enrolled in the city's schools and military wives may work as secretaries, teachers, and nurses in the Anchorage community, and these families may patronize retail and service enterprises, but they do so with the understanding that this will last only for the duration of the husband's military assignment.

The simple presence or absence of this segment of the population -- in 1960, 25,000 of the 226,000 who lived in the Anchorage area were military -- also has an important effect on the community. When large movements take place which involve these persons (in 1958, for example, 13,000 military personnel left the state), the economic and social life of Anchorage is likely to be directly affected. Again in 1958, and probably associated with the out-migration of the military personnel, 8,500 civilians also left the state.⁴

"Spirit of Anchorage"

Given this fluid population, both military and civilian, there is a cultural premium attached by more permanent residents of the state to their own permanency. According to Rogers, Alaskans are fond of the idea that their state is the "last frontier" open to Americans and that their lives in Alaska -- the clean air, the unspoiled wilderness, and the simplicity of their style -- are the embodiment of the "American dream."⁵ These ideas may be associated with two important features of the Alaskan situation: first, the relative youth of the state and its communities (Anchorage, for example, was founded in 1914, and incorporated in 1920), and, second, the great dependence of the economy of the state on the federal government. More than half the personal income of residents of Alaska derives from positions in federal, military, or civil agencies, a fact which requires, perhaps, some explanation or compensation in the light of the American tradition of individualism.⁶

Paradoxically, however, the people of Anchorage, as residents of the state's largest and most progressive city, are proud of the cosmopolitan character the city has taken on. All of the amenities of city

living in the "lower forty-eight" have been consciously sought: utilities, schools, and cultural events which are equal to, if not better than, a city of comparable size elsewhere in the nation. Probably this campaign does not exclude the "last frontier" mythology completely; some sort of combination of the two -- a cosmopolitan pioneer spirit, perhaps -- may be the goal. Even so, the urbanization of Anchorage has not been completely endorsed by the community; some residents have suggested that in following this course of action the city has been misled. A wiser investment of public funds, these critics have argued, largely to themselves, would be the more productive solution, for example building roads to open up potentially lucrative mining areas. But progress, in its more obvious manifestations, remains the goal of the city. Rogers, in a description of the spirit of Anchorage, suggests how the youthfulness of the city, the presence of the military, and the nature of the city's population contribute to this notion of "progress" in the city's life.

The spectacular expansion of the last two decades resulted from decisions by government planners to locate the major military installations in its vicinity and the Alaskan Command Headquarters just outside its corporate limits. Aside from its strategic location, the forces and elements of Anchorage's growth came from outside the area. As if to illustrate this underlying character, the community does not flow naturally from its physical setting, but appears to be forced upon it. . . . Having little history of its own, drawing the bulk of its residents from non-Alaska sources, the essential spirit of Anchorage does not look back for inspiration. It reaches aggressively and greedily to grasp the future, impatient with any suggestion that such things take time.⁷

This emphasis on wider streets and public utilities -- the construction of a "Fifth Avenue on the tundra" -- has had an important effect on the city department most frequently involved in these improvements, the public works. Thus, that it is, with 169 employees, the largest single city department, may be a reflection of the "spirit of Anchorage." Clearly it is also a reflection of the enormous expansion of the city's population; in the decade from 1950 to 1960, the population of the city increased fourfold, from 11,000 to upwards of 45,000. Just prior to the earthquake, for example, a new hospital had opened, another hospital had greatly increased its operations, a natural gas utility had been formed, a new port facility had been constructed, and the public school system was in the process of change and enlargement. These additions to the city's public facilities were required to serve the growing population adequately, but they were also consistent with the ethos of the community. Not only does this emphasis on progress affect public agencies like the public works, but it also defines to a great extent the type of private enterprise most appropriate to the community. Construction industries and other service-oriented businesses predominate in Anchorage, providing the specialized and professional assistance which a growing population demands.

Structure of the City Government

The city government of Anchorage follows the council-mayor-city manager pattern. The legislative functions of the system are performed by the eight-member city council and by the mayor. City councilmen and the mayor are elected by direct ballot, three members of the city council being elected each year. Elections for both councilmen and mayor are nonpartisan. All matters concerning city policy and major decisions concerning city planning and construction must be considered by the council and the mayor.

The city manager is the chief administrative officer in the city government. Appointed by the city council and the mayor, he has administrative authority over all city departments and agencies, and is the direct supervisor of all the heads of these departments. Thus, the director of the public works, like his counterparts in the other city departments, is responsible to the city manager. The latter, of course, is directly responsible to the city council and to the mayor. The principal function of the city manager is the coordination of all municipal departments, including the annual submission of the budget and other similar administrative tasks. He also has the authority to hire and fire (with discretion) the heads of the various city departments, just as they, within each of their departments, exercise similar authority.

A number of citizens' commissions and review boards have been established to assist the mayor and the city council in matters of policy and enforcement. These are associated with the various city departments as, for example, the parking and traffic commission is with the traffic engineering division of the public works. In addition to these groups, a civil defense disaster committee exists in Anchorage, made up of representatives from many of the city departments -- like the police and fire departments -- and from several civilian groups. Significantly, prior to the earthquake, no one from the public works department was included on this committee.

Communications among the various departments of the Anchorage city government is facilitated by memoranda -- particularly when the communications are from the top down -- and by telephone and radio. All city departments, the public works, telephone, municipal light and power, etc., with the exception of the police department, share the same radio frequency. The police department employs a separate frequency for intradepartmental communications.

The physical location of the departments also makes possible a considerable amount of face-to-face communication. Some administrative offices, like those of the city manager and the mayor, are located in the City Hall; those of the director of public works, the manager of the water division, and the entire engineering staff of the public works, are located in the City Hall Annex which stands directly across the street from the City Hall. The fire department, police department, and civil defense (and the court room and legal offices of the city) are found in the Public Safety Building about three blocks away. Some 14 blocks northeast of City Hall and City

Hall Annex is the city garage and shop; based in this building are the equipment maintenance, general maintenance, and sanitation sections of the maintenance division of public works. The water crews and the maintenance crews of the building construction and maintenance section of the engineering division also work from this building, although the administrative offices of these elements of the public works are in the City Hall Annex. The water treatment plant, located on Ship Creek, is some seven miles from downtown Anchorage; thus, communication between the offices of the water division in the annex and the plant is largely by radio and telephone.

Earthquake

Timing

In those disasters, like earthquakes and explosions, for which there is very little or no warning, the timing of the impact becomes a crucial, if an uncontrollable, factor. When warning is possible (in tornados, hurricanes, floods, and the like), time is available before impact to make certain preparations which will reduce the injuries and damage of the disaster. To that extent, the timing of the disaster is controllable, at least in the sense that persons and property threatened by the disaster can be removed from their normal locations to places of greater safety. There was, however, no warning in the Alaskan earthquake. This section briefly suggests some of the consequences of the particular time of day and season of the year in which the earthquake struck.

With the advantage of hindsight -- "After all, it could have been worse" -- a number of observers recorded some of the advantages of the earthquake coming when it did, at 5:36 p.m., Good Friday, March 27. Dr. Martha Wilson, Director of the Alaska Native Hospital in Anchorage, for example, made these comments in Public Health Reports:

Had we planned this earthquake, we could not have chosen a better time. In the late afternoon of Good Friday many offices were closed and many people were driving home in automobiles, a relatively safe place to be. Everyone was awake and most persons were clothed. Even more important they had their shoes on, usually an important point in Alaska survival. Fortunately, on this day and during the following week, temperatures ranged from 20°F to 30°. During approximately four months of the year the weather is severe enough to cause fatalities in a disaster situation if suitable clothing and shelter is not immediately available. Building fires for warmth in this disaster would probably have been as hazardous as the freezing cold. When the quake started, the electricity went off immediately. Had it struck at the same time of day three weeks earlier it would have been dark, and no one without a flashlight would have been able to see to rescue children, avoid

falling objects, escape from breaking and falling structures, or avoid the numerous crevasses which were opening and grinding closed in the earth.⁸

Associated with the early evening of a Friday before a holiday weekend, patterns of community life -- the early closing of shops, offices, and schools, -- undoubtedly helped to keep the toll of dead and injured relatively low. The count of dead in Anchorage as a result of the earthquake was, in fact, only nine. Likewise, although the ground was still frozen and the spring thaw was still several weeks away, the fact that the earthquake occurred near the end of winter probably reduced the hardships severe cold would have provoked. Similarly, the remaining hours of daylight facilitated immediate search-and-rescue operations which would have been much more difficult at night.

In his report on the geological characteristics of the earthquake, Hansen remarked on the fortuitous timing of the earthquake given the almost total destruction of the city's Government Hill Grade School. "If any good fortune accompanied the March 27 earthquake," he wrote,

. . . it was its timing; had school been in session, the disaster would have been unthinkable. The south wing of the school dropped as much as 20 feet vertically into a graben after being split longitudinally. The playground was a mass of chaotic blocks and open fissures.⁹

For these, and numerous other reasons associated with the rhythm of community life, the timing of the earthquake may be seen as a crucial factor in explaining the relatively low toll in lives the disaster claimed.¹⁰

Vibratory Damage and Landslides Resulting from the Earthquake

Alaska is part of the seismic belt which circumscribes the Pacific Ocean. Following the southern side of the Aleutian Islands, the belt moves northeast, widening with the Kenai Peninsula and extending inland to the central Alaskan region of Fairbanks. Thus, Anchorage, located just at the mainland juncture of the Kenai Peninsula, is a part of that seismic belt. Evidence exists in the Anchorage area suggesting a number of previous earthquakes, but none resulting in damage comparable to that of 1964 has occurred during the 50 years of Anchorage's settlement.¹¹

Indeed, the March 27 earthquake was probably the strongest yet experienced in North America, registering 8.2 on the revised Richter Scale. The quake apparently lasted from four to seven minutes in Anchorage and began with strong east-west movements followed by north-south waves. This rotation of shocks accounts for the damage to high-rise buildings in the area; however, the most extensive property loss was the result, not so much of the vibration itself, as of the combination of these shocks with landslides, surface cracking, and the instability of a substance known

locally as Bootlegger Cove clay which underlies many areas of Anchorage.¹² Brief descriptions of the major areas of damage follow, with particular emphasis on the effects of the earthquake on public property for which the public works is responsible.

With the exception of the six-story control tower which collapsed at the Anchorage International Airport, vibratory and ground cracking damage struck hardest at private property. The six-story Four Seasons Apartments, just completed and not yet occupied at the time of the disaster, was completely destroyed; Penney's five-floor downtown department store was also damaged beyond repair. Two identical fourteen-story apartment houses almost a mile apart sustained extensive vibratory damage. This selectivity of the physical effects of the earthquake is noted by Hansen. He writes that:

. . . multi-story buildings having large floor areas commonly sustained significant structural damage. . . . Thus, direct seismic damage was highly selective. Aside from variations in design, construction practice, and workmanship, large buildings were more severely damaged than small ones. Inertia was a factor, of course; other things being equal, heavy structures are more susceptible to vibratory damage than small ones.¹³

Damage resulting from ground cracking was, in Hansen's word, "capricious." Such damage was, however, most likely in areas built on Bootlegger Cove clay or in areas with differential ground composition as, for example, areas in which fill had been used. Cracking also tended to follow street curbs and splits made by winter frost. The most extensive and severe damage resulting from cracking occurred in connection with the landslides, especially with the Turnagain Arm and 4th Avenue slides.

Five separate landslides resulted from the earthquake, one of which was small and caused little damage, relative at least to the other four. This smallest slide, variously called the Native Hospital or 1st Avenue slide, involved little more than four acres of land. Part of the lawn and parking lot of the Alaska Native Hospital broke away and slid down the bluff behind the hospital, destroying a fuel storage tank at the foot of the bluff. Surface fractures associated with this slide extended back as far as the hospital building itself and resulted in some damage to the building.

The most spectacular landslide affecting the downtown area of Anchorage was the 4th Avenue Slide. It was concentrated on the north side of the city, especially along the north side of 4th Avenue, an area of business and commercial concentration. In total, some 14 city blocks were damaged, the two blocks between B and D Streets being totally destroyed. Many businesses, apartment houses, and residences in the 36 acres affected by the slide were damaged beyond repair. Between B and D Streets, where the damage was most concentrated and property values were highest, the graben had a width of one hundred to two hundred feet and was as deep as eleven feet; in addition to this vertical displacement, there was in the same area lateral movement northward of as much as 17 feet. Given its central location, the 4th Avenue Slide received immediate attention following the quake.

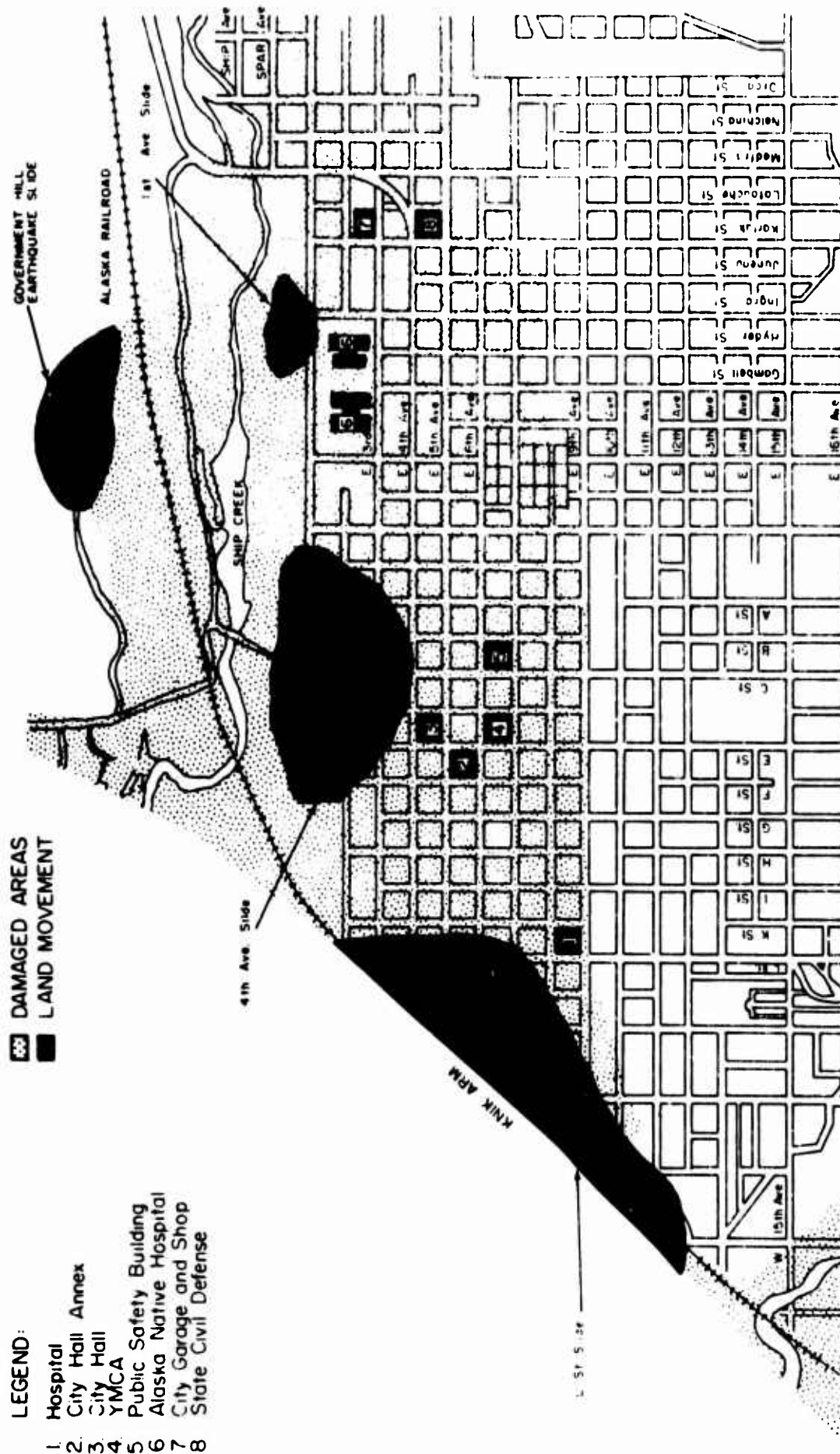


Fig. 1 - Anchorage, Alaska: Location of Damaged Areas and Selected Organizational Buildings, 1964

The Public Safety Building was two blocks south of the graben (at 6th Avenue and C Street), and City Hall and City Hall Annex were three blocks west on 5th Avenue. Because of the area's high value, it was also felt to be particularly susceptible to looting; for this reason, it was heavily guarded during the emergency period. Streets, as well as underground utilities such as water, sewers, and telephone were totally disrupted in this area. In addition, the danger of unstable buildings was acute owing to the concentration of taller buildings in this commercial district than was true of more residential areas. Despite its proximity to the slide, the Public Safety Building was not structurally damaged, and auxiliary power was almost immediately available to replace the normal sources which were cut off by the earthquake. Thus, the Public Safety Building became the disaster headquarters during the emergency period.

The City Hall and City Hall Annex, three blocks west of the 4th Avenue Slide, were also three blocks east of the second major slide to affect downtown Anchorage -- the L Street Slide. Most of the damage resulting from this slide was concentrated along the graben which extended for about 4800 feet above the bluff overlooking the Knik Arm of Cook Inlet. Together with its marginal fractures, this graben affected 14 acres of an area thickly settled with residential and commercial buildings. The graben itself was as wide as 200 feet and dropped as much as ten feet in some places. Lateral shifting of up to 14 feet occurred within the area bounded by the graben and its pressure ridges, but despite this horizontal movement, little obvious damage resulted. Not so obvious, however, was the extensive damage to the utilities systems in the area, as well as essentially hidden structural damage to some of the buildings.

Along the graben of the L Street Slide, the damage was both clear and extensive. The utilities directly affected sustained almost complete destruction, ultimately requiring completely new installations. Hansen describes the L Street graben in the following statement:

Over all, the graben looked like a dry canal or a stream bed, and when contrasted with the lack of damage on either side, it stirred considerable speculation in the minds of early viewers. . . . One popular magazine account stated that it resulted from the collapse of an old buried but melted-out ice-filled channel!¹⁴

Of its effects on streets and buildings, he adds:

The whimsical pattern of destruction in Anchorage was perhaps best exemplified by the L Street slide; here wrecked buildings inside and astride the graben faced almost undamaged adjacent properties on either side. . . . Damage was equally capricious . . . in the compressed areas at the tow of the slide; here individual dwellings were buckled or shoved by pressure ridges that as often as not left adjacent buildings undisturbed.¹⁵

The remaining two slides occurred in the residential areas of the city: the smaller of the two affected the Government Hill area, and the largest of all five land dislocations, the Turnagain Heights section. The Government Hill slide resulted in the destruction of the Government Hill Grade School, contributing significantly to the total of three million dollars damage sustained by the Anchorage school system. In addition, the earthflow in this eleven-acre slide spread out in the yards of the Alaska Railroad just below the bluff on which the school was located. Together with other damage to the railroad such as the failure of bridges, damage to rolling stock and tracks, and vibratory damage to car shops, the cost of the yard damage was upwards of two million dollars. Three houses were also destroyed in the Government Hill slide.

The largest of the Anchorage landslides was suffered by the Turnagain Heights area, a residential neighborhood overlooking the Turnagain Arm of Cook Inlet to the southwest of Anchorage. According to Hansen, the Turnagain Heights slide was

the largest, most complex, and physiologically most devastating landslide in the Anchorage area. It extended west to east along the bluff line about 8,600 feet. Its maximum headward retrogression from the bluff was about 1,200 feet; its average retrogression into the heavily populated residential section of Turnagain Heights, where 75 homes reportedly were destroyed, was about 500 feet. A total area of 130 acres was completely devastated by displacements that broke the ground into countless deranged blocks, collapsed and tilted at all odd angles. The ground surface within the slide was lowered an average of 35 feet below the old pre-quake level. The volume of earth within the slide was about $12\frac{1}{2}$ million cubic yards.¹⁶

Hundreds of fractures opened behind the head of the slide in areas of the Turnagain neighborhood which, simply because the vibrations ended when they did, were not directly involved in the slide. However, these fractures added to the total disruption of utilities service and the damage to streets and curbing in Turnagain Heights. Within the slide area itself, hundreds of sharp-crested clay ridges were thrown up by the severe dislocations of the earth. These ridges, averaging between 15 and 20 feet high and as much as 300 feet in length, alternated erratically with ground depressions resulting from the quake. "The chief distinction of the Turnagain Heights slide," Hansen concludes, "was the utter totality of its disruption."¹⁷

Effects of the Earthquake on Utilities and Other Public Property

Extensive damage was done to private property, both commercial and residential, by the earthquake. The vibrations, the surface cracking, and the landslides contributed directly to the losses private property owners

sustained during the seven-minute disaster. While extensive damage resulted elsewhere, in other parts of Alaska and in California, especially from tsunamis generated by the quake, the concentrated property damage in Anchorage accounted for about 60 percent of the total. In less than five minutes, according to press estimates, some 2,000 people were made homeless in Anchorage.

Utilities, streets, and public buildings were also affected by the earthquake. The most extensive damage was sustained by underground utilities like water and sewers, although the telephone and gas systems (the latter is a private corporation) as well as the electrical system (which, like the telephone utility, is a city department separate from the public works) also sustained considerable damage. Losses to the storm sewer system were estimated as affecting about 50 percent of the system; twenty-five percent of the sanitary sewage collection system was damaged beyond repair. The water system was completely drained by numerous breaks resulting from the earthquake. These breaks were especially serious in the landslide areas, but about 75 additional breaks in other areas resulted from surface cracking and land displacements. An estimated 50 percent of the underground distribution system was directly affected by the earthquake. In addition, the flow of streams like Ship Creek which are the major sources for the system was temporarily reduced by the loss of water into cracks and fissures in the earth. However, some water continued to enter the system as a result of natural gravity flow although landslides near the intake reduced the amount and subsequently turned this water muddy.

Because electrical power was lost when the earthquake struck, the water treatment plant, normally an automatic system, became a manual operation. The failure of electrical power also left the seven underground wells in the water system inoperative. Later inspection revealed that three of these wells were seriously damaged by the quake.

Hansen makes the following comment on the loss of electrical power in Anchorage, suggesting that it, like the fact that school was not in session, etc., was a blessing.

Providentially, electric power failed at the very onset of the quake. . . . Although the loss of power might seem to be an added hardship to the stricken city, untold numbers of fires were probably avoided because of the lack of electric current in all the severed wires -- and at a time, too, when water was unavailable for fighting fires.¹⁸

Streets were disrupted in the areas of major slides -- 4th Avenue, L Street, and Turnagain -- and were also damaged in other areas by the surface cracking associated with the landslides and with the instability of earth materials. Government Hill Grade School was the only city-owned structure to suffer almost complete destruction; other public buildings received considerably less severe damage. For example, offices in City Hall and City

Hall Annex were disrupted as a result of the vibrations, although no serious structural damage was sustained. Similarly, the civil defense offices in the basement of the Public Safety Building were unusable for about three days following the earthquake. Total municipal damage, including that to underground utilities, was estimated at 19 million dollars.

The public works department itself also suffered minor vibratory damage of this kind. Stock in the garage warehouse, for example, was considerably disrupted by the shocks associated with the earthquake. Records and maps in the City Hall Annex offices of members of the public works engineering division were also disorganized. The only serious structural damage was the collapse of the garage roof over the sanitation trucks, damage which did not affect the trucks themselves except to keep them inaccessible for two days until the debris could be removed. With this exception no serious loss of equipment was sustained by the public works as a result of the earthquake.

While the public works experienced little direct damage to its structures and equipment, that department was immediately responsible for streets and utilities extensively damaged by the quake. In summary, then, the statement in the 1964 Annual Report that the public works, "probably more than any other agency of the City, was dramatically affected by the March 27th earthquake,"¹⁹ is less year-end hyperbole than fact.

FOOTNOTES: Chapter II

1. The discussion of Anchorage, its climate and geography, is based primarily on two sources: George W. Rogers, The Future of Alaska: Economic Consequences of Statehood (Baltimore: The Johns Hopkins Press, 1962); and Wallace R. Hansen, Effects of the Earthquake of March 27, 1964 at Anchorage, Alaska (Washington: United States Department of the Interior, 1965).
2. Interestingly, however, the Anchorage construction companies were forced to continue certain ground and construction operations into the winter months following the earthquake. As a consequence of these disaster operations, they discovered that the building season can be profitably extended past the October freeze by the use of plastic coverings and similar equipment. Howard Kunreuther and Elissandra S. Fiore, The Alaskan Earthquake: A Case Study in the Economics of Disaster, Case Study F228 (Washington: Institute for Defense Analysis, Economic and Political Studies Division, 1966), pp. viii, 113-115.
3. Robert E. Graham, Jr., Income in Alaska: A Supplement to the Survey of Current Business (Washington: Office of Business Economics, U.S. Department of Commerce, 1960), pp. 22-23 cited in Rogers, Future of Alaska, p. 107.
4. Rogers, Future of Alaska, p. 109.
5. Ibid., pp. 18, 142-144. Comments indicative of these ideas often appeared in the interviews conducted by DRC. A number of respondents made reference to the "pioneer spirit" of the members of the community in their reactions to the earthquake and to the fact that everyone worked together for the good of all. That this cooperative response need not be attributed to the "pioneer spirit" of Alaskans, but rather to the effect of any disaster on the social system is suggested by Charles E. Fritz, "Disaster," in Contemporary Social Problems, ed. by Robert K. Merton and Robert A. Nisbet (New York: Harcourt, Brace and World, 1961), p. 685.
6. Rogers suggests that the ubiquity of the federal government in Alaska gave rise to one of the "myths" offered frequently as an argument for statehood: if only Alaska could determine her own destiny, all of her social and economic problems, which derived from the federal government anyway, would be solved. Cf. Rogers, Future of Alaska, pp. 145ff. That Alaska continues to be "economically underdeveloped" is suggested by the figures Rogers cites for 1959: during that year military payrolls totaled \$112 million and the earnings of civilian employees of military installations added another \$50 million to that total. These two sources accounted directly for almost one-third of all personal income in the state. The comparable figure for the United States as a whole was 3.5 percent. Ibid., p. 114.

7. Ibid., pp. 9-10.
8. Martha Richardson Wilson, M.D., "Effect of the Alaska Earthquake on Functions of PHS Hospital," Public Health Reports, LXXIX, No. 10 (1964), 853.
9. Hansen, Effects of the Earthquake, p. 54.
10. However, this kind of reasoning can go on indefinitely: "If's" arise almost automatically to compound the disaster. If it had been at night, if it had been in the coldest part of the winter, if school had been in session, if people had been living in the apartment house or had been shopping in the department store which collapsed, if, etc. . . .
11. Cf. Hansen, Effects of the Earthquake, pp. 66-67.
12. This, and other damage information contained in this section, is derived from Hansen, Effects of the Earthquake.
13. Ibid., p. 22.
14. Ibid., pp. 43, 47.
15. Ibid., p. 43.
16. Ibid., p. 59.
17. Ibid., p. 61.
18. Ibid., pp. 4-8.
19. City of Anchorage, Annual Report, 1964, Anchorage, Alaska (Anchorage: 1965), p. 18.

CHAPTER III

TIME ONE: NORMAL STRUCTURE AND OPERATIONS

The internal organization of the public works department consists of six divisions, each structurally independent (at least officially) of the others and directly responsible to the public works director and his assistant. These divisions are: administration and engineering, traffic engineering, building inspection, maintenance, water utilities, and airport. Within the three largest of these divisions, engineering, maintenance, and water, the organization is further differentiated by sections. The maintenance division, for example, is made up of three sections: equipment maintenance, general maintenance, and sanitation (figure 2).

In the following discussion the "normal" operations, both official and unofficial, of five of these divisions are considered. (Only the airport division is not discussed: relative to the others, it is very small and its tasks are somewhat tangential.) Administrative personnel whose positions are officially located in the joint administrative and engineering division are considered separately because some of these personnel are actually engaged in administrative tasks in other than the engineering division, i.e., not all public works administrators are engineers. In addition, their administrative functions are analytically distinct from the variety of their other tasks. Administrative personnel are, for these reasons, discussed as a separate unit. Apart from these deviations, all other structural distinctions made in this discussion follow the public works official table of organization. Section and division overlapping and unofficial intraorganizational connections which normally exist, as well as patterned relationships which exist between the public works and other public and private organizations, are also indicated.

Administration

According to the 1964 Anchorage city budget, the public works department is charged with the following "major maintenance operating functions":

. . . the maintenance of streets, sewers, buildings, the water utility, engineering and construction of the streets, water and sewer lines, and miscellaneous engineering for other departments, municipal airport, building inspection and permits, traffic engineering, and administration and public service and information relating to these fields.¹

Three principal functions of the public works department may be suggested on the basis of this statement, of which the more important two are directly reflected in the personnel structure of the administration. The first -- engineering, including both planning and inspection -- is represented in the director of public works (or city engineer) and his assistant. Indeed, the official requirements for incumbents of these positions include a background in engineering. The assistant director of public works, in addition, is the

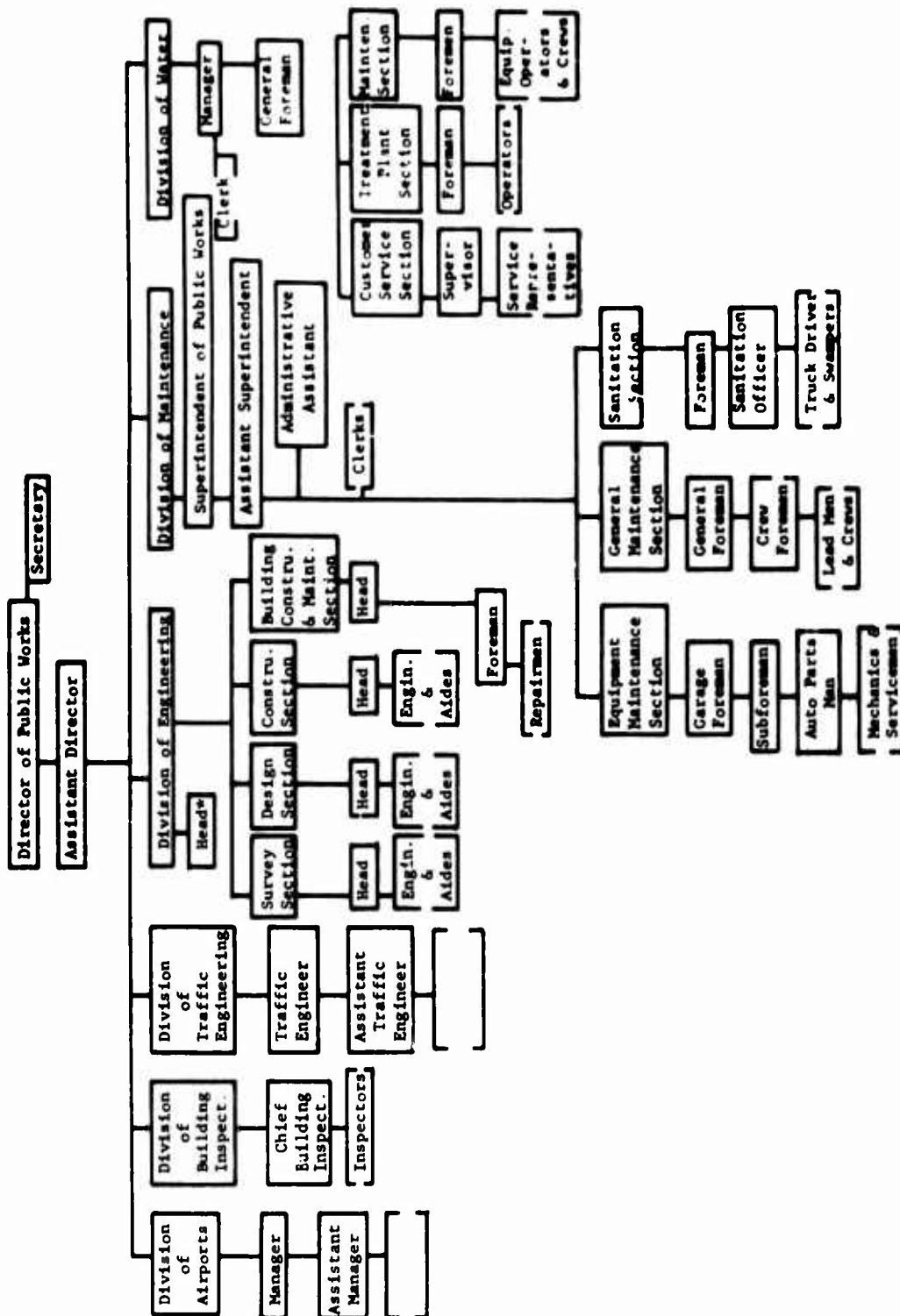


Fig. 2 - Time One Organization Chart, Department of Public Works, Anchorage, Alaska

official head of the division of engineering; thus, he may act as liaison between the four sections which make up the engineering division and the administration of the entire public works department.

The second function is that of maintenance (construction and repair) and is embodied in the positions of public works superintendent and assistant superintendent. Like the assistant director, the public works superintendent and his assistant occupy positions which are at once part of the administration of the public works and part of one of the divisions which make it up. He and his assistant are the official heads of the division of maintenance as well as members of the administration of the total organization.

The third function of the public works department may be loosely characterized as "services" -- including both record-keeping and customer services. Although the clearest structural indication of this function appears in the division of water in its customer service section, the position of departmental administrative assistant, included in the administrative staff of public works, but located by the organizational table in the division of maintenance, also belongs in this classification. The evidence from both Time One (figure 2) and Time Two (figure 3) charts suggests that positions with responsibilities primarily in this area are largely removed from the major operations of the public works. Their tasks are indispensable but tangential to the engineering and maintenance focus of the organization, and whether these positions are considered in terms of decision making, lines of authority, or communications, they appear peripheral to the two principal functions of the public works.

Engineering: Director and Assistant Director

While the director of public works is officially responsible for the operations of the entire department, and thus for all three of its functions, his personal background is less administrative than engineering. He was described, in fact, as an engineer who is learning organization "the hard way -- by experience." For this reason, and because of the diversity of the separate divisions in his department and the wealth of details which this diversity involves, he permits his division heads to operate as independently as possible, a policy of which the division heads generally approve. Daily conferences with his assistant and with the public works superintendent, as well as such discussions with the individual division heads as are required, are held to keep the director informed of the department's operations. Formal staff meetings are held once a week. However, the greatest portion of his time is spent in activities related to engineering.

The position of director is also the official link between the public works department and the larger city organization. Communications with the city manager or with the city council are officially channeled through the director of public works. Budget and policy decisions which require the approval of the city manager or the city council are normally presented to these city officials by the director. In the other direction, communications from these officials enter the public works through the office of the director, and, by way of the assistant director, are sent to the various divisions and sections of the department.

The bulk of the administrative paper work -- requisitions, memoranda, requests, official forms, etc. -- is the responsibility of the assistant director, although like the director, he is an engineer rather than a professional administrator. His opinion of much of this paper work is suggested in the following description one public works official gave of a method of dealing with written questions:

The paper work /that/ goes through here is terrific. I find that some of these notes, the questions that come over here, are so trivial in subject that I feel they are not worth bothering to answer. So I stick them down in the bottom of the pile usually. And then I dig down into it three or four days later, and nine times out of ten, those particular ones that I've shoved down there have taken care of themselves. They didn't need answering in the first place.

Essentially the same device can be employed in "making decisions" either in conference or by telephone with the division heads. In effect, an administrator suggested, the decisions have already been made at the divisional level; what is required of an administrator is confirmation or approval, rather than an actual decision, and such approval can often be given tacitly, avoiding both time-consuming written forms and lengthy conferences. The independence of the various division heads thus frees both the director and his assistant of the necessity of making a great number of decisions for these members of the department. The same procedure is followed in "answering questions" which come from the section heads within a division. One official described his response to such questions in the following statement:

It seems that a lot of the things that come to me . . . are probably things that are coming from some of my section heads that only want confirmation of a decision they've already made. They've always made up their minds what they're going to do and if I can see that there was no harm in it, why let it go and don't even bother to answer it. Nine times out of ten they'll put it in the form of a question. If I don't answer it, they'll go ahead and do it.

While these practices free administrators of much decision making and question answering, they also contribute to independent actions on the part of division and section heads which conflict at times with the official definitions of appropriate and orderly operations. This is particularly true of the process of requisitioning equipment and supplies.

Like the director of public works, the assistant director's administrative role is largely a coordinating one, mediating between the director and the division heads of the public works as the director mediates between public works and the city administration. Thus, the contrast between administrative

activities on a "normal day" and those immediately following the earthquake, are, with the exception of the absence of paper work, roughly the same: "You're still meeting people, you're still contacting your people, you're still determining what they're up to, and you're talking to your individual section heads and making decisions for them." Thus, his emergency tasks were in a broad sense just like those he carried out on any other day.

Contrasting the positions of director and assistant director, the latter is associated most closely with purely administrative duties -- decision making and question answering; only major decisions and questions normally require the action of the director. However, for both these positions, given their officially designated location in the organization and the training demanded of those who hold them, the focus of normal activities is engineering rather than administration (or, perhaps, engineering administration). These activities nonetheless involve coordination of the various other departments within the organization. Because the bulk of this administration falls to the assistant director, it was suggested that his "two-headed" position as assistant director and head of the engineering division be split, designating one man to head up the engineering division and another to act as assistant director full-time. Such a division of labor, it was stated, has been established in other cities only a little larger than Anchorage and would be much more efficient ("The assistant director/ would have more time for the entire department rather than trying to do two things only half as good as he/ would choose") than the present arrangement.

Maintenance: Public Works Superintendent
and Assistant Superintendent

The second function of the public works department is represented administratively by the public works superintendent and his assistant. They are nominally, more than functionally, a part of the administration, for their principal duties are those associated with the maintenance division, of which they are head and assistant, respectively. Indeed, little evidence exists to suggest that their inclusion in the administration makes any difference in their behavior when it is compared with the activities of the other division heads whose positions do not include them in the administration. Like the heads of the divisions of traffic engineering, building inspection, and water, the superintendent and assistant serve as the link between the director and assistant director of public works and the foreman and crews within their division. Only the size of the maintenance division (it is the largest single division within the public works) and its obvious relationship to the maintenance function of the department provide rationale for designating the superintendent and his assistant as members of the administration.

The duties of the superintendent are those of coordination and supervision. Normally, a working day begins with a conference with the foremen of the general maintenance section, the section which demands the greatest amount of direct supervision and also the section which is most closely related to the major maintenance functions of the department (streets and sewers). Following this review of projects and assignments, the superintendent usually spends a few minutes with the director of public works discussing the more

important projects, keeping him informed of present operations and those scheduled for the future. The superintendent also receives the requests and complaints which have been collected by the public works department and passes these on to the foremen of his division. Communication of this type is normally done by radio when the men are already in the field, although the superintendent also makes a daily tour of the three work areas into which his division has divided the city to inspect personally the work in progress. He completes this inspection by visiting the equipment maintenance garage and the sanitation dump to check on the operation of the other two sections within the maintenance division.

The general maintenance section is charged with all street maintenance (snow removal and storm drainage), maintenance of sanitary sewers, and operation of the sewer lift stations. In addition, and as a part of "good public relations," crews are authorized to provide personal aid to the public -- pulling out an automobile stuck in mud or snow, for example. Similarly, the superintendent favors "good public relations" within his division, between him and his foremen and crews. One member of the division contrasted a former superintendent's approach to employee relations with the incumbent's.

[A] superintendent that used to be here . . . was real hard-nosed. He used to beat the desk and, brother, they'd get with it. [The present superintendent is] not that type of person.

He and his assistant and the head of the general maintenance section form, according to a member of the division, a "pretty close-knit group." Most discussions concerning decisions which affect the operations of the division are held by these three men; all major problems, however, are discussed with the director, who is the superintendent's immediate supervisor.

Personal relationships of this type frequently characterize the division's associations with the community and with other organizations. Members of the division, for example, receive many telephone calls reporting disrupted conditions in the city's streets or sewage system. ("City Hall never realizes," said one respondent, "that we get this kind of information nor how much we get.") Often the callers will ask by name for a particular member of the division, some of whom have worked for the city as long as twenty years. Of one such employee an official of the department noted:

He grew up in this town and the old-timers know him. If they have a problem, they'll call and ask for him. People feel that they can get action a little faster, and probably they do.

The superintendent, too, has established acquaintances in almost all of the municipal and state organizations -- the police and fire departments, port department and telephone utility, and the state department of highways -- and these facilitate a more personalized relationship between the public works and these organizations than would otherwise be possible. In his informal liaison capacity with these organizations, the superintendent has developed

gentlemen's agreements, particularly with the state department of highways, providing for the exchange of favors and the loaning of equipment on condition of repayment. Although similar arrangements had been set up with private contractors, these exchanges have been discontinued; an official of the public works explained what had happened:

They're bugging you for everything. They're using us as a warehouse and I asked to be relieved of it because it was taking a lot of my time and we're not warehousing that stuff for the contractors.

Other members of the maintenance division, like the general foreman, had worked for the state prior to coming to the public works, and the interorganizational friendships of these men also aid in promoting mutual aid arrangements, at least between public works and related state departments.

The duties of the assistant superintendent of public works are similar to those of his immediate superior. Like the superintendent, the assistant's authority, despite his inclusion in the administration of the entire public works, extends only to the division of maintenance. His normal activities are largely those of supervising the work of the general maintenance section, making certain that jobs which have priority are attended to first, and insuring that problems which arise in the process are adequately resolved. Both the assistant and the superintendent have the authority to make local purchases of supplies and equipment up to five hundred dollars; purchases in excess of that amount require the approval of the city council. Normally, however, since the assistant occupies a position subordinate to the superintendent, he authorizes such purchases only after consultation with the superintendent.

The chain of command -- from the director of public works, through the superintendent to his assistant -- is generally followed, although there is some indication that the head of the general maintenance section sometimes goes directly to the superintendent with questions and problems, without going through the assistant. The close personal relationship which apparently exists among these three would not seem to require strict adherence to the chain of command in all circumstances. In any case, the work of both the assistant and the superintendent frequently takes them out of their offices into the field. When one or the other is thus unavailable, the similarity of their positions and authority suggests that whichever of them is available can handle most contingencies.

Office Services: Administrative Assistant

The position of the administrative assistant is also located in the division of maintenance. The duties of this position, however, are administrative, in the sense that they are coordinative and concern the entire public works department. Thus, the rationale which included the head and assistant head of the maintenance division in the administration is reversed; here, a largely administrative position is physically a part of the division of maintenance, although it is both nominally and functionally included in the administration.

The administrative assistant is in an office position. He is responsible for all the paper work for the public works -- requisitions, purchasing, some cost accounting, and similar reports -- and is responsible as the administrative superintendent of the foremen for all the reports they are required to submit. With the exception of a clerk-typist in the engineering division, who does some of the typing and reports, the administrative assistant works alone.

Because he is responsible for office routine, he is not in the operational (engineering-maintenance) chain of command. His supervisor appears to be the public works superintendent, although he also receives requests from the director of public works and frequently confers with him on matters of office procedure. His, then, is a somewhat ambiguous position with respect to the departmental chain of command. In effect, he is the "servant" of both those above him -- the superintendent and the director -- and the foremen under him. In neither case, however, are the vertical authority relationships clearly defined. Interview data suggest that the administrative assistant has solved this problem by accepting "requests" from administrators and foremen and by rejecting "orders" from both.

The scope of his work -- from payroll to workmen's compensation to cost accounting and requisitions -- brings the administrative assistant frequent occasions to call on members of all the divisions within the public works. The residual nature of his duties (whatever cannot be handled in another office is routed to the administrative assistant) adds to the diversity of these contacts. Generally, he goes to the person who is most likely to have the information he requires, regardless of the official chain of command. Such a procedure is frequently followed by administrators in the public works, as one of them indicated:

You get faster service going and talking to the one who ought to know. You want to know something and they can answer right now . . . and they don't object.

Only when there is a larger problem, one which involves policy decisions or authority which a clerk or a foreman does not possess, does the administrative assistant go to the director or to the city comptroller. This is sometimes required because he is outside the chain of command, and the official information flow, largely memos, often reaches him after it has been received in other offices. At times when he does not have complete information and is not certain who would have the necessary data, he checks with the public works superintendent. If the superintendent does not know either, he will track down the information for the administrative assistant.

Engineering and maintenance are the principal functions of the public works department and they are clearly represented in the official structure of the administration by the director and assistant director on the one hand, and by the superintendent and his assistant on the other. Such office services as are required to support these two sets of operations are distributed

throughout the organization and are officially -- but rather haphazardly -- represented in the administration by the administrative assistant.

That the administration is neither formally (i.e., by the table of organization) nor informally (i.e., by the functions of administrative incumbents) a separate division of the public works is evidenced in all of the administrative positions. The director is essentially an engineer; the assistant director must be both an administrator and an engineer. The public works superintendent and his assistant are only nominally administrators. The administrative assistant, whose position is the most functionally administrative of the five finds himself in the maintenance division, somewhere below the head of that division, the public works superintendent. In each of the administrative positions, the incumbent is called upon to divide his attention to a greater or lesser extent between the public works as a whole and one of its separate divisions, i.e., either engineering or maintenance.

These structural characteristics suggest that the public works department is not singular, but plural: they are a federation of independent divisions, with the administrative positions -- the embodiment of the idea of a single public works -- attached loosely to the engineering and maintenance divisions. This conclusion is also suggested by major reorganizations within several of the divisions and within the department itself. In 1963, for example, the building construction and maintenance section was formed from members of the engineering and maintenance divisions. Located initially as a section in the engineering division, it became a separate division of the public works late in 1964. Similarly, in 1963, the water utility was put together out of elements of the maintenance division. And in 1964, at the time the building construction and maintenance section was made a separate division, two other divisions, traffic engineering and building inspection, officially became autonomous departments, no longer responsible to the director of public works but directly to the city manager. The division of airports has been functionally -- and physically -- independent since its inception, although it has remained nominally a part of the public works.

The structure of the public works department is perhaps best understood, then, less as an entity in itself than as a comparatively loose federation of independent divisions. Under these circumstances the director of public works may necessarily have to allow his subordinates a greater degree of decision-making autonomy than would be required in a tighter organization. Similarly, the administration of such a loose organization may need to be part of its independent elements if it is to remain viable. The administration of the public works, thus, emerges out of the units which make it up as a kind of representative body, making decisions collectively rather than independently.

Engineering Division

The engineering division, headed by the assistant director of public works, is composed of four sections: survey, construction, design, and building construction and maintenance. Each of the sections is headed by a Civil Engineer III (civil service classification) who is responsible to the assistant director. The duties of the assistant director have already been

discussed, but his responsibilities as head of the engineering division have not. Following a brief description of his engineering activities, this section has been divided into four parts corresponding to the four sections within the division.

Like the director of public works, who sees his division heads daily, the assistant director as head of the engineering division tries to meet with each of the section heads every day. The assistant director is responsible for the hiring of all engineers in the division, and his relationships with them were described as generally amiable. He is, however, most friendly with one of the section heads, a man who functions, in fact, as the assistant director's "right-hand man." Evidence suggests that there may be some negative reaction among the other section heads in the engineering division with respect to the friendship ("Others would like to go out with the boss for coffee once in a while too," said one respondent), but additional data indicate that the relationship, although based on personal friendship, is largely concerned with departmental affairs. The assistant director is also a good friend of the engineer directly below this particular section head. This latter friendship, which the assistant director is scrupulous not to evidence during working hours, is the result of previous common work experience.

On the other hand, a strained relationship does exist between the assistant director and the head of one of the other engineering sections. This person has a reputation as a man who can accomplish a job but who often goes about it in a less than orthodox manner. His tendency to act first and seek permission afterward and, in at least some circumstances, to go directly to a higher office without informing his supervisor, have led to budgeting difficulties and to personal complications with the assistant director. That this section head is very competent only adds to the problem of dealing with him. He was described by a public works official in the following somewhat mixed statement:

He'll get things done and without going in the proper routes, so to speak. Sometimes he doesn't have the financial backing and he doesn't find this out until it's too late. Then we have to manipulate financially to get the job done. I'm not saying that what he did wasn't right. I mean that it was right but that the order of business wasn't. The financing should have been taken into consideration and then go to it, rather than do it first and find out how we do it later. . . . So in this case he is overstepping his bounds in the administrative and financial field. He's a great doer, great for getting the job done, but sometimes there's a great penalty for these things.

Outside the engineering division, the assistant director sometimes encounters similar problems with the chain of command. Two city officials (both located completely outside the public works) deviate at times from the official channels of communication and such actions complicate procedures and made difficult the completion of an assignment. As a result, the assistant director

has developed a personal means of dealing with these situations; after receiving orders or information from other than the official source, he traces the communication back to those who issued it in order to be certain of receiving accurate and complete data.

Members of the engineering division work closely with the city planning department, but their relationships are not always cordial. The perspective which the engineer is likely to take of a project is not always identical with that of the less technically oriented planning department. Thus, plans which appear feasible when population density and related factors are taken into account by the planning department may be for other reasons almost impossible for an engineer. These difficulties, however, are apparently professional in origin rather than the result of personal conflicts or of deviation from official procedures. With these exceptions, then, the relationships of the assistant director (as head of the engineering division) with persons within his division and with related personnel in other city offices are relatively free of interpersonal or formal complications.

Survey Section

The survey section includes from eight to ten persons in the winter months, and from fifteen to thirty during the peak summer months. These men are responsible for

control, topographic and construction survey s
for all construction programs within the Engineering Division; completion of the address change within the City; and 50 100- and 500- scale maps for water and sewer lines, streets, house numbers, subdivisions, etc.²

During the summer building months, most of the survey personnel are deployed in the field; the head of the section, for example, spends about half his time during the summer outside the office supervising the work. The winter months are devoted to bringing the city maps up to date and to reproducing and filing these maps. The section is also responsible for providing public information, e.g., information concerning the house-numbering and address system. Other city organizations and other divisions within the public works rely on the survey section for the street and utility maps essential to the location and maintenance of public works installations.

Unofficially, the survey section usually produces the public works cartoonist. Personnel in the section are amenable to performing a number of favors for both their co-workers in public works and for the public. One member of the section described some of these favors.

The guys come over to you and they want a description of this or that. Then there's always somebody coming in who wants to know whether anybody ever surveyed his lot or where his corners are. If you can dig the information out, you give it to

him. . . . It isn't something you'd consider a normal function of the city engineer's office, but, on the other hand, it generates a certain amount of goodwill.

Like the public works superintendent who is also convinced of the usefulness of this goodwill, the head of the survey section normally encourages his men to provide these unofficial services. Indeed, he himself is frequently called upon unofficially, largely because he has been employed by the public works for many years. In this respect, he is one of a number of "old-timers" at the public works; as one of these men said:

I apparently end up being a source of information for many people here that . . . is not due to anything other than the fact that I've probably been with the city about as long as anyone else . . . and people come in and ask questions about this and that. . . . It's stuff that happened in the past or several years ago and if they have questions on it, they come in and see me.

The survey section head has structured the division of labor within his section to allow overlap among assignments. Thus, two men are assigned to the reproduction of city maps; their work overlaps to an extent with the work of those personnel responsible for making additions and corrections to the maps, and of those assigned to coordinating and filing of the maps. The ranking member of the section shares the work of the section head under the same rationale. "It's a matter," one member of the section explained,

. . . of one person handling all of one thing and that one person is gone, and you're out of business. And so what we do is to set up everything so that no one person makes any real difference to the organization as far as operation. The only difference he makes is in how much time has to be put in to accomplish his work.

Sharing of task responsibilities is reinforced by section informality. The section head and his assistant not only work closely with each other, but also are good personal friends. The section head, however, attempts to maintain some distance between himself and those others who work for him, to strike a balance between friendliness and formal authority. But the permanent members of the section are few enough to allow personal relationships to emerge among them; this friendliness probably has a positive effect on the official policy of sharing tasks.

The chain of command within the section is similarly informal. Members of the section refer either to the section head or his assistant whenever they have questions or problems. Indeed, one member of the section suggested that there is no real chain of command: "As far as I can determine, about ninety-five percent of the time they'll talk to the assistant; they could care less whether they talk to him or the section head."

The policies of the section are rather clearly established so that either the section head or the assistant can make most decisions. Directives from outside the section come from the director of public works or from his assistant, although occasionally something will come from the city attorney, port director, or planning director. As is generally true of the other sections of the engineering division, the public works administration allows the survey section considerable freedom of operation.

Typical of many of the divisions and sections of the public works is the professional relationships which city employees maintain with their private counterparts. Thus, the city surveyors know most of the private surveyors in Anchorage and are able to call on them periodically for advice and favors. According to a member of the section, "this informal interchange of information among the engineers and surveyors in town is a valuable asset." An analogous exchange has been established by the section head and his assistant with many of the other city organizations -- the city manager's office, planning department, building officials, taxation offices, city attorney, etc. This exchange has been facilitated by a conscious attempt on the part of the section head and his assistant to become personally acquainted with those who hold these positions and work in these departments. The advantages of this personalizing process were explained in the following statement:

/We/ try to know the people we're involved with personally so that rather than this memo bit where you just write a guy a letter and he doesn't know you've met him, we call him on the telephone and go to see him and spend a little time with him so that he knows who we are and what we do and when we ask for something, we have more cooperation.

In addition, it was suggested that there are certain disadvantages to the standard impersonal approach.

This tendency to regard everybody as just somebody in another building somewhere, this results in problems sometimes. It takes longer to get the job done and it may not get done the way you want it done. If you have verbal contact with the man and he understands what you want and you understand what he wants, this avoids a lot of problems.

Because the survey section has frequent cause to call on others outside the section for information -- and because the services the survey section provides are often required by others -- this emphasis on "first-name" relationships is likely to be virtually required, although certainly unofficially. From the perspective of the survey section, the entire public works organization takes on this informal character. Thus, one respondent indicated that about the only persons in the department who employ formal modes of address are the secretaries. For everyone else, from the public works director to the maintenance men, first names are sufficient. This observation, however, is probably colored by the inclinations and requirements of the members of

this section, as well as by the relatively lengthy employment of several of its members.

Design Section

The design section of the division of engineering is composed of some ten or eleven persons whose principal duties are associated with the design of city projects. Most of the personnel are either engineers or draftsmen. Like the other three sections of the engineering division, the design section is headed by an engineer (civil service classification Civil Engineer III), who is assisted by the man directly below in the classification-authority system. Much of the work of the members of this section is office work, although during the summer construction months some field inspections are made (unofficially) by personnel of the section.

Because the design section is at the center of the engineering function of the public works -- and because of the close personal ties between the head of the design section and the assistant director of public works -- members of this section work directly with the administration more frequently than do members of any of the other sections in the engineering division. Because the director of public works is more often concerned with intra-organizational and administrative matters than his assistant, the latter is likely to be called upon for engineering advice and policy by members of the design section. The head of this section, in fact, as the unofficial assistant of the assistant director, assumes the responsibilities of directing the public works when members of the administration are not available. He is also asked, again unofficially (at least in terms of his job description), to write certain memoranda and recommendations for the public works.

Additionally, other members of the department at times ask the design section head to use his unofficial influence to affect decisions which members of the administration are to make. Foremen from other divisions of public work, for example, have asked the head of the design section to help them by talking to the director and having him change requisitions submitted by their supervisors. While the requests involve no violation of legal standards, they do represent deviations from the official chain of command, deviations which do not always contribute to harmonious relations between the design section head and other comparable members of the public works.

The chain of command within the design section follows the civil service classification of positions. Design engineers have authority over draftsmen in the section. Similarly, among the engineers, their authority positions are consistent with their civil service classification. Strict adherence to this system is not characteristic of the design section, however. Depending on the circumstances -- the characteristics of the task, the knowledge a given individual may possess of a project, etc. -- information and orders may be given by the head of the section directly to one of the draftsmen. This arrangement, which appears to be typical of all the units within the public works, is also characteristic of the chain of command outside the section. Thus the director or his assistant may confer with one of the engineers or draftsmen without going through the head of the section.

Relationships with other divisions and other city organizations are frequently marked by personal acquaintanceships, either those which are based on previous experience together (the design section head and the manager of the water utility worked together, for example) or those based on friendships which have developed out of necessary work contacts ("I think it all goes along with the closeness," said one engineer, "we know each other rather well personally and in making shortcuts, we do it efficiently whereas in a much larger office you can't"). Personnel in the design section work closely with the maintenance and water divisions, the engineers drawing up the plans for installations which division crews will have to maintain. If the plans, then, can be made consistent from their beginnings with the procedures and equipment of these divisions, problems of maintenance and repair can be avoided.

Other extraorganizational cooperation results, not so much from overlapping responsibilities, as the presence of a professional fraternity. Engineers in the telephone department, for example, call on their counterparts in the design section for moral support in convincing the telephone administration that a certain set of plans instead of another, or one location rather than some other, is preferable. In addition, the professional fraternity includes private engineers in Anchorage whose advice may be sought on public projects. Particularly useful are the suggestions of those engineers who have been previously employed by the city and have, as a result, firsthand knowledge of the existing utility system. Although the exact number of former employees now engaged in private business is not known, comments from members of the public works, in virtually all of the divisions, suggest that there may well be a sizeable number of them.

Construction Section

The construction section is responsible for construction site inspection of all contracts let by the city. It is also responsible for assessment calculations of street construction and repairs and, during the winter, is engaged in the actual design of street construction projects. Composed of approximately six permanent members, and, depending on the work load, extra temporary men during the summer, the section is headed by a Civil Engineer III whose assistant, a public works "old-timer," is a Civil Engineer II.

Each of the inspectors in the section is assigned, during the summer months, to separate construction jobs; the result is that the official authority structure (i.e., the civil service classifications) does not have much relevance. Officially, the assistant head has authority over all of the inspectors but in actual practice this authority is not often evoked. Rather, each of the inspectors generally works independently of the others and makes the minor decisions and changes which accompany any construction without consultation with either the assistant or the section head. This independence of overt authority is suggested in a section member's description of his official responsibilities.

I work with contractors. I supervise and administer . . . construction contracts. The city council

awards a contract and then they turn it over to /us/ for supervision of inspection and administration of the contract. . . . My job duties, I would say, are very loosely and probably broadly described. They are not that specific. My main job is to foresee possible problems or make necessary changes and adjustments in projects that aren't apparent at the time they are awarded.

The same freedom of operation is described in the following characterization of the section head's position and the position of one of his inspectors.

/The section head/ has authority in /the director's/ office to handle problems with construction contractors and to delegate authority to me. His authority is seldom ever questioned, consequently mine is not. He's quite an independent little man and tolerates no interference and just about runs his section himself.

Priorities in these inspection operations are established by the contracting crews; whenever a decision is required which directly affects the progress a contractor makes on his project, that decision takes precedence over every other task.

During the winter months, the section is devoted largely to office work. Contracts from the previous building season are settled, plans for the coming season are developed, and necessary revisions are made in these plans before the work actually begins. Because the building season is relatively short (five months), advantage lies in making as many of the changes and revisions in construction plans as possible before the work begins. Similarly, the top priority of working crew's problems is based on the importance of efficiency during the summer.

The independence of the members of the construction section is reflected in the extent to which deviations from the official decision-making process and chain of command are tolerated. All along the line of authority, decisions are made at a lower level than is officially required. Supervisory personnel are informed of these decisions only after the fact. For one member of the section, this freedom constitutes "one of the most attractive aspects" of his job. Thus, he said:

I'm fairly free to make most decisions. If it involves a large amount of money, I usually clear it with my boss. If there are times that I don't feel there is enough time -- if there's something that has to be decided right away and he's not available -- I usually go ahead and make it. If he feels I've made a wrong decision, then he tells me so, and I get an appropriate chewing out . . . but he doesn't begrudge the fact that I've made the decision.

The small size of the section and the fact that many of the members have been employed by the public works for some time probably makes this independence possible and considerably more effective than it might otherwise be. However, the more important contingencies appear to be those associated with the independent nature of the assignments themselves and the efficiency required by the climatic limitations on the building season.

The section head maintains more overt friendly relationships with his subordinates than has been typical of those sections already discussed. All the personnel in his section are close friends. They have been working for the department five to nine years -- an average length of service which appears to be somewhat higher than that typical of public works employees. Nor is this friendship limited to the job as is frequently true of other units of the public works. Hunting and fishing trips involving members of this section, as well as other friendly nonwork associations, are a normal part of the section's activities.

Like the other sections of the engineering division, the construction section maintains a number of work-related ties with other divisions within the public works and with city organizations outside the department. "Actually, we get involved in pretty nearly all the departments at one time or another," said a member of the section, "but I would say the water utility, maintenance division, telephone department, and municipal light and power department most frequently." In the course of their official duties, section inspectors also take on a number of unofficial tasks; the most important is directly related to these extraorganizational ties. One member of the section described this task:

I travel around the city all day every day and I have occasion to see things that possibly need attention that are really not necessarily my responsibility. But I generally call the appropriate person -- whoever the job belongs to -- and try to see that it does get done.

Arrangements have also been made with fire and police departments and with the gas company and water utility to notify them when streets and utilities are to be cut off during construction projects. The section head has friends and acquaintances in virtually all of these organizations which facilitates the necessary communications. The official channels for notifying other city departments of changes and construction projects, it was suggested, are not always the most efficient. In addition to these ties with other city departments, the head of the construction section maintains close ties with private contractors in the area. These relationships are the result of his section's responsibilities: the inspection and supervision of construction projects contracted by the city.

Another Time One characteristic of the head of the construction section which was to be especially significant during the emergency was the esteem with which he is regarded by many of his fellow engineers. Both the head of

the survey and of the design sections respected the ability of the construction head. Thus, one described him as:

. . . just the type of person that commands a lot of respect and has a personality such that the people he works with willingly go along with him.

The assistant in the construction section is one of the "old-timers" in the public works department. His advice, as a result, is frequently sought by members of public works who have not been employed so long. His position was described in the following statement:

/He has/ a very wide range of experience in the construction field and the young engineers up there . . . /go to him/ with problems they have been doing -- principally how to work out something so it's going to be practical.

Since the earthquake, the assistant has been transferred to the port department and, because of his experience and unique qualifications, no one has been found to fill his position. Typical of his function in the public works as an "old-timer" is this characterization of him by the head of one of the other engineering sections.

He is a very old-timer, probably forty or forty-five years in the construction business. Fantastic memory. He can remember a method of solving a problem from forty years ago that will still work today. And he is very free in passing his information out . . . and that's very valuable to us many times.

Building Construction and Maintenance Section

The building construction and maintenance section of the engineering division was officially established in October of 1963, although it had existed for some time as an unofficial section of that division. Its principal responsibilities are associated with structural engineering, preventive maintenance, remodeling, and repairs of the eighty-six publicly owned buildings in Anchorage. In addition, the engineering staff of the section provides assistance to local architects and builders in meeting the standards set up by the building codes and serves as a coordinating and supervising agency for decision making in these matters. The origins of the section are outlined in the following statement from the 1964 Annual Budget of Anchorage:

Departments not employing civil engineering personnel called upon the /engineering division/ for design and estimating assistance. As the demand for these services increased it soon became necessary to make a specific assignment of an engineer

and a repair crew to handle them. Through necessity, a section has been set up, though unofficially, within the division. It was decided that the future need for such a unit is apparent and this budget request is made for it for the 1964 fiscal year.³

From the same source, the rationale for the section's organization within the public works is suggested, as well as an indication of the specific type of work the section will accomplish.

Considerable research work has gone into the organization and operation of this section. The type, use and size of all buildings has /sic/ been determined, "as built" plans have been assembled or produced, a cost accounting system has been set up, a cost curve covering routine jobs has been developed, an estimating table for numerous phases of construction work is being developed, a monthly inspection program of all buildings has been started, preventive maintenance as well as breakdown maintenance is being accomplished and where possible, city forces are used to accomplish work that would otherwise be contracted on a time and material basis.⁴

This section, then, combines the functions of both the engineering and maintenance divisions; it is a hybrid section, responsible for structural engineering designs and plans on the one hand, and for maintenance operations on the other. Thus, it belongs neither in the engineering division nor the maintenance division but would be most effective as an independent division -- a status which it attained some seven months after the earthquake. That it was, however, the most independent of the sections of the engineering division, particularly during the emergency period, will be discussed later in this report.

The section is composed of half a dozen men, loosely organized into two groups corresponding to the dual functions of the section. Their engineering responsibilities are assigned to the head of the section and his assistant, both classified as civil engineers. The maintenance and repair functions are the responsibility of the remaining men, who are essentially individual specialists in the relevant trades -- carpentry, plumbing and heating, and electrical work. These men, plus two general maintenance men, are supervised by the building maintenance foreman, who at Time Two, doubled as the professional carpenter of the section.

Perhaps to an even greater extent than the other sections of the engineering division, the building construction and maintenance section does not follow a strict chain of command; rather, the small size of the section, the individualized nature of the work, and the antibureaucratic methods of the section head produce an informal atmosphere and a pointedly independent orientation to the work. The section head's somewhat unorthodox interpretation of supervision was described in the following statement.

He has never cared if the men don't show up until noon. He knows if they take off early or if they come in late that their job is going to be done anyway. He can rely on them, there is no question about it. . . . It works very well. No one has ever taken advantage of it.

This same informal approach characterizes the section's relationships with other divisions of public works and with other city departments. Because this approach is not shared by others, the section head has often found himself and his section less than completely appreciated by his colleagues. "We pretty much have a reputation as the 'do-it kids,'" it was suggested.

We bounce in; we get it done; we move out. Sometimes we don't even ask if it's all right to do it. We just do it and worry about the consequences later. . . . We were sometimes very unpopular with other departments because we do get kind of over-zealous and we skirt the normal channels of the bureaucracy. . . . We don't adhere to them too strictly.

The section has also taken on a number of unofficial tasks, particularly the kinds of tasks which would, if they were done officially, take a considerable amount of time or, perhaps, never be authorized at all. Thus, members of the section provide engineering advice and structural plans on small jobs for city departments which do not employ engineering personnel; they are frequently called upon to provide men and equipment, unofficially, for little jobs which have not been budgeted, and to produce special tools and equipment for the water utility and the telephone department. For the parks and recreation department, more than any other city organization, the section does much unofficial "moonlighting." "They operate on a very limited budget," a member of the section explained, "and they have a small staff over there working constantly to improve the park system against great odds: so we help them out whenever we can with whatever we can." Unofficially, the section members also do favors for city employees who come to them for building advice and inspection: "If we can find the time, we'll fit it in." Priority in tasks, however, is always given to their official responsibility for the maintenance and repair of city-owned buildings.

The section head's informal adaptation of the authority system appears to be largely successful within his section. Those who work for him are granted the autonomy required to accomplish their work. As an independent carpenter or plumber or electrician, each is able to make his own decisions without constant referral to the section foreman or the section head. Indeed, one of the criteria for being hired in the section is the ability to work with little direct supervision. This autonomy is extended even to policy decisions: in the absence of both the section head and his assistant, the men are authorized to make their own decisions, with the assurance that

the section head will, whether their decisions were right or wrong, back them up. Understandably, the section head has sometimes been required to defend procedures at variance with the official public works regulations. He is convinced, however, that the advantages in this approach are greater than the possible disadvantages, a point of view which suggests that he is less concerned with his relationships with those outside his section than with those within it. Indeed, this independence is the source of much positive feeling within his section as well as some negative reactions from those outside.

During normal operations, for example, the independence of the section especially affects the section head's relations with his superiors. Not only the decisions made by members of his section, but also his own decisions made when the assistant director and director are unavailable -- and of which the section head informs them only after the fact -- often are the source of administrative displeasure. The section head is aware of what he is doing in making these unilateral decisions. He expects to get his "chewing out" if his decision is wrong; if it is right, he can expect "a pat on the head."

Similarly, the section head occasionally uses funds before they have been officially allocated to him. In situations he defines as serious -- repairs which are required immediately and the like -- he often goes ahead and makes the repairs before sending the work proposal to his superiors. When such a proposal for funds is turned down after the work has already been done, he has to pick up the money elsewhere in his budget to cover the deficit. These deviations from standard procedures, together with an apparently blunt manner of speaking with others, result in certain communication problems with others in the public works. Thus, it was indicated:

/Section/ relationships with some of the other department/s/ . . . are very poor. And the reasons they are very poor is because /we/ will just flatly tell them, "No, you go to hell," or what have you when it's necessary. /We've/ gotten in a fling with . . . just about everybody on that.

To this propensity for blunt speech, add a refusal to accept administrative pressure.

We don't accept pressure from above. To their saying, "Well, I've got to have this yesterday," we reply, "You just wait your turn; we have your work scheduled and we're going to do it." If we don't consider it of utmost importance, why, they just wait -- regardless of who it is. On occasion we have bent before it -- but not usually.

When these characteristics are combined with deviations from the department's official procedures for decision making and financial allocations, the results are very likely to be disrupting to the administration. Thus, to say, as one respondent did, that the section head's communication with those below him was much better than his communication with those above him is probably something of an understatement.

Additional evidence suggests that this assessment should be amended to include positive relationships with those members of the department (and other city organizations) whose positions are roughly equal to the section head's. A forthright approach and impatience with bureaucratic procedures probably annoy superiors in an organization far more than equals or subordinates. The difficulty, in oversimplified terms, is that the section is not bureaucratic enough. To that extent, the subsequent independence of the building construction and maintenance section (i.e., its autonomy as a division within the public works) may be seen as a partial solution to the problem. By making official the independence which the section had unofficially claimed, but by removing the section from the bureaucratic props of the engineering division and forcing it to compete on equal terms with other divisions in the department, the administration might force the section to bureaucratize itself.

Maintenance Division

The maintenance division of the public works is the largest single division of the organization. It is composed of three sections and is headed by the superintendent of public works and his assistant, two positions which are also included in the administration of the entire department. Each of the three sections is headed by a foreman responsible to the superintendent of public works and his assistant. In the following portion of this report, each of these sections -- the general maintenance, equipment maintenance, and sanitation sections -- are discussed.

General Maintenance Section

The general maintenance section of the maintenance division is made up of some thirty permanent employees who are augmented during the summer months by about half their number in temporary help. The section is headed by the general foreman who supervises the three section foremen directly below him in the chain of command. Each of these foremen is responsible for one of the three sectors into which the city is divided. Within each of these sectors the foreman and his crew are charged with maintenance of streets, storm and sanitary sewers, snow removal, and other related functions.

The crews are made up of men with varying skills and varying experience with public works, some more knowledgeable about city installations than others, but the composition of these crews is not constant. The foremen are free to choose among the available men on the basis of the assignment, picking men whom they feel will be most useful in completing a particular task. Nonetheless, there appears to be an unofficial norm that the men with considerable time in public works will be assigned so that each crew has at least one man with personal knowledge of procedures and locations of existing installations. Thus, a certain degree of consistency does exist in the composition of the crews. This is particularly true of winter work when heavy equipment like snowplows is typically in use. "It's real good," one of the operators suggested, "if you can work with the same person. You get a team working: it makes real nice teamwork." If the men have worked together,

greater efficiency is frequently the result because they can anticipate the other's mode of operation.

Generally the men who have been employed by public works for an extended period of time hold the position of Maintenance Man III or IV. These are the employees who are included in every maintenance crew and who are designated within the department as "lead men." The lead man of any crew occupies a position of authority directly below that of the foreman. Officially, however, the lead man does not have the same authority as the foreman, even in the foreman's absence, although the lead man is delegated the responsibility of supervising the work of the crew when his superior is not there. Unofficially, the foremen have granted their lead men essentially the same authority in decision making which foremen enjoy. As one foreman put it:

The way I feel about it, if a man's going to be a lead man, he's the same as a foreman because you're putting him in that position and he should be making the decisions.

One of the members of the crew expressed the same expectations:

There's times that we know there's things to do and we go ahead on the job. I mean, that would be the only efficient way to do it. We know what's to be done. The foremen can't give us every detail and that's what some of the older fellows are supposed to be for.

Increased authority is delegated to the lead men during "normal emergency" work when the foremen find it impossible to directly supervise all the operations of their crews. The annual crisis which accompanies the spring break-up (approximately the middle of April), for example, is marked by an increase in the authority of the lead men as the section attempts to control flooding and to remove the mud and slush from the streets.

Each of the foremen and his crew are responsible for all maintenance work in their sector of the city. This work includes a wide range of tasks as was indicated in this summary statement:

Our normal duty is streets, sidewalks, storm drains, sewers, and anything else that would go along with them in maintenance. You can just about guess what goes along there: in winter time there would be snow removal, snow haul, sanding, and in the warmer spring days, we have problems with thawing and drains full of ice and so on. And then, of course, when the spring comes you have your major break-up when we try to keep the drains open, keep them from flooding, and, of course, the sewer problems which are there the year round. In summer time our work will consist of dust control, plus storm

storm drains, cleanup along the streets, pavement repair -- repaving and patching -- just about anything that goes along with the maintenance of any street.

The range of the work, however, makes proficiency in all its aspects difficult for any one of the foremen. As a result, some specialization has taken place. One of the foremen, for example, is unofficially designated as a supervisor of sewer maintenance. That he is also the senior man with a good deal more experience in the maintenance division than either of the other two foremen probably adds to his authority in this area. City systems, particularly those such as sewers which are not surface installations, are difficult to locate and maintain since the city maps are not always complete. Men who have firsthand knowledge of those installations -- men who were involved in the initial planning and construction of the sewer system, for example -- are especially vital to efficient maintenance and repair. The other two foremen, thus, rely on the third for advice and assistance in their own work. He, in turn, frequently consults with the head of the sanitation section for similar advice. Again, the reason for this consultation is the greater experience of the head of the sanitation section.

Emergency work is not alien to the members of the general maintenance section. The spring breakup is a yearly crisis, predictable certainly, but a situation which calls for emergency action nonetheless. Crises also occur in the city's sewage and water systems which the men of the general maintenance section are expected to meet. Such emergencies require that a certain amount of flexibility be built into the structure of the section. This is one reason why the men are not permanently assigned to any one of the foremen or to any one of the sectors of the city, or indeed, to any one type of work. Similarly, working hours must be variable if the recurrent emergencies are to be met. One foreman suggested the following situation as typical:

You can go to work in the morning at 7:00 and have all your work phased out, and by 12:00 noon everything's changed.

And a crew member described his own work experience.

It is not out of the ordinary here for them to have you do most anything. Suddenly things come up, a sudden emergency like a break in the water mains, and maybe you have to work all night even during normal times to get the water back on.

These "normal emergencies" also affect the section's relationships with other units in the public works and with other city departments. Maintenance personnel are loaned to other divisions of public works and to other departments when extra emergency help is needed. Within the section unofficial tasks are taken on, tasks which may be done as favors for other sections of the maintenance division or for other divisions of the public works. In addition, the members of the general maintenance section may, at their own

discretion, provide services unofficially for the public. Permission to engage in these activities has come from the public works superintendent under the rubric of "public relations."

The three foremen meet with the section general foreman at least once a day to draw up plans for future work and to make necessary decisions concerning present assignments. These meetings, which may take place in the morning before the men have been dispatched or at the end of a workday, sometimes include the lead men. One of the foremen, for example, likes to have his lead men explain the work to the members of the crew as this, he believes, tends to reinforce the position of the lead man and allows the foreman to delegate greater authority to his assistant. Major decisions, however, are normally left for the foremen to make, or, if there is a chance that their decisions may "backfire" (as one of the foremen put it), they are passed up to the general foreman and his supervisor.

According to the members of the section, the official chain of command is generally followed. Such deviations as occur result from the temporary inaccessibility of persons who officially should be consulted. "When you try to run down or try to look for something," one of the foremen said, "a lot of times you have to bypass somebody if you're going to get it done that particular day." When such gaps in the structure are created, the foremen attempt to fill them in as soon as possible by informing their superior of what has been done. Various members of the administration apparently follow the same procedure when they bypass the foremen and send orders directly to the men on the crews. At times some friction results from this kind of variation in the chain of command; one of the crew foremen expressed his reaction in the following statement:

I feel I know my men better than anybody else knows them. I know their capabilities and I know where I should place them. I don't feel that any man -- any supervisor above me -- should dispatch my men, and I don't feel that they should give me a job when it should come through the chain of command, because my immediate supervisor is the one that I consult and it's his responsibility. . . . Of course, I didn't care for it a bit and I expressed my opinion on two or three occasions of this.

This was not a criticism of all his superiors, however. The foreman indicated that there were no such difficulties between himself and his immediate supervisor, the general foreman; the latter has always conscientiously informed crew foremen of orders issued in their absence. In this respect, the general foreman acts much like a colleague of the crew foremen rather than a superior; certainly greater pressure motivates a subordinate to inform his superior of decisions made in the superior's absence than motivates a superior in the reverse of that situation. The colleague relationship of the three crew foremen and the general foreman will be discussed later in this monograph.

The five-hundred-dollar limit which applies to the requisitioning power of other employees of the public works also applies to the foremen of the maintenance division. Any equipment or supplies which cost in excess of that amount must be cleared through the director. The official process of requesting purchases, however, does permit a certain degree of deviation. As was true in other sections of the department, members of the general maintenance section engage in what may be called "after-the-fact requisitioning": when supplies are immediately needed, they can be acquired without the official paperwork. The record keeping can be done later. This practice is apparently common among the foremen; the lead men of their crews have also operated in this manner.

Such unofficial procedures are facilitated by the friendships which link members of the public works with the suppliers of the maintenance equipment. One of the foremen has worked with the department long enough to have established personal ties with most of the suppliers in Anchorage. Thus, he can send one of his men for whatever is needed and obtain it immediately on his own assurance of payment.

The work of the general maintenance section frequently is affected by decisions made in the engineering design section. Decisions made there which result from budget limitations are particularly apt to have repercussions for the section since maintenance crews will be responsible for the upkeep of installations designed by these engineers. Consequently, the general foreman and one of the crew foremen go directly to the head of the design section whenever budget problems arise. If the section head is not available, normally they will talk with the assistant director of public works. This relationship, which also holds in the reverse direction, is perhaps the most important extradivisional tie of the general maintenance section, although the section frequently works with the water division as well. In fact, one of the foremen was, before the earthquake, employed only half-time in the general maintenance section; the remainder of his time was spent with the water division.

Extradepartmental ties are maintained with many city organizations. The section's work requires coordination with the municipal light and power department, the telephone department, and the police. The general foreman has personal friends in all these organizations as do at least two of the crew foremen. Exchange agreements with the Alaska State Department of Highways, like those with city departments, are unofficial. With the state department, these agreements are limited to the borrowing of equipment and supplies, and do not normally include the borrowing of men. Arrangements have also been made between the maintenance section and its counterpart on the state level to share in the maintenance of certain streets in the Anchorage area which are not clearly defined as either city or state responsibilities. Extradepartmental ties exist between the general maintenance section and local suppliers of equipment and between the section and the railroad. Again, one of the foremen has friends among railroad personnel.

Equipment Maintenance Section

The equipment maintenance section, like many of the other sections of the public works, is essentially autonomous in its operations and authority system. Officially, the section head -- the garage foreman⁶ -- is responsible to the public works superintendent, but in matters pertaining to the repair and maintenance of city equipment, the foreman makes virtually all decisions. This autonomy is increased by the complete financial separation of the equipment maintenance section from the public works. The Annual Budget (1963) includes the following statement which explains the peculiar financial status of this section.

The equipment maintenance section⁷ performs the function /sic/ of acquisition, maintenance and repair and replacement of vehicular equipment used by all City Operations except the Fire Department. It is a self-sustaining operation and it is intended that all costs of vehicle acquisition, maintenance and repair and operation be paid through appropriate rental of such equipment to other City departments. These rental rates are reviewed from time to time to insure that the garage fund neither makes a profit nor suffers a loss from operations and to insure that the rental rates reflect the actual costs incurred to operate each type of equipment.⁷

This section, then, is service-oriented, extending its service to all city departments which use vehicular equipment in their work. This characteristic has effects both on the relationships of the section to other public works sections and divisions and on its relationships with other departments within the city.

At Time One, the equipment maintenance section included some eighteen men, responsible to the garage foreman and divided into two shifts. The day shift is on from eight in the morning until 4:30 p.m. and is made up of eleven men (including the garage foreman): the day subforeman, five mechanics, a welder, a body man, and two service men. The night shift, which works from 4:30 until half-past midnight, is somewhat smaller, composed of six men: the night subforeman, two mechanics and two service men, and a welder. The night shift is limited to work defined as "trouble-shooting" because parts are almost impossible to obtain during the evening hours. Unless the parts can be assembled by the day crew, the second shift generally cannot attempt major repairs and overhauls.

The men in the section are usually assigned to jobs on the basis of their experience, particularly those men who are classified as mechanics, body men, and welders. The tasks of the servicemen are somewhat more flexible; they may take on a wide variety of responsibilities. One of the servicemen suggested that his formal classification -- Auto Equipment Service Man -- is just "a fancy title for flunky." "They can put me on any job," he

said, 'whether it's light or heavy duty and figure I'll qualify on the job " Asked to perform a certain task, such as building gutter brooms for the street sweepers to fill in for someone who was ill or on vacation, he has inherited the job permanently: "Between the hitch and the switch I was put on the job and I've been left on it." This attrition of responsibilities is apparently typical only of those positions with vaguely defined job descriptions.

For the other men in the section, tasks are assigned by job classification. But even among men who are classified similarly, among mechanics for example, there is some differentiation in individual skills and experience. Thus, one of the day mechanics is consulted by his co-workers when problems arise in transmission repairs. This man's experience makes him something of an expert relative to the other men. The subforemen also serve as consultants available to answer questions and make decisions concerning the work of the section. When these decisions require the attention of someone higher in the authority system, the garage foreman, the assistant superintendent and the superintendent of public works are consulted in that order -- at least officially. One of the subforemen indicated that normally when decisions involve members of the division administration, the assistant superintendent is as high as he needs to go. This same subforeman often informally seeks the advice of the head of the sanitation section since he, like some of the other "old-timers," has considerable experience in public works.

The service orientation of this section and the pressures for quick repairs sometimes applied by those the section serves result in "Joe McGee-ing," an expression which refers to the practice of repairing equipment rapidly, but only temporarily. Joe McGee, according to one of the subforemen, was a mechanic whose only tools were a hammer and a chisel, a pair of pliers and some baling wire -- "and that's how he fixed." Another form of "Joe McGee-ing," practiced in emergencies, during snow storms and the like, is to borrow parts from one piece of equipment to keep another working. In fact, highest priority is assigned to emergency equipment: police vehicles, followed by garbage trucks, and street maintenance equipment. During the winter maintenance equipment employed in snow removal -- caterpillars (cats), snow leaders, belt loaders, and dump trucks -- are looked after more quickly. The garbage trucks are checked every week by one man whose Saturday job is to inspect these pieces of equipment. If one does break down, it normally requires two or three men working together to repair it.

When pressure from other departments for quick repair of their equipment results in "Joe McGee-ing": and the equipment is returned for more lasting repairs, or when the initial repairs are simply done inadequately and the piece comes back to the garage, some foremen, according to one respondent, cover up for the man who did the job:

Instead of giving it back to the guy that did it
and making him do it right, /the foremen/ give it
to somebody else and don't say anything about it.

Related to this practice of avoiding complaints is the record keeping of the section. The principal, although unofficial, function of this paper work

is to demonstrate that repair work has actually been done when questions or complaints arise.

All you keep records for anyhow, as far as that goes, is to keep down complaints -- to keep them from saying: "Well, I brought the truck in to get it fixed and they didn't fix it." The best way is to make out a slip and date it . . . and then when it's fixed, well, then it's marked off. They can't say: "Well, I brought it in; I told him about two or three days ago, and he didn't fix it."

According to another member of the equipment maintenance section, some of these problems can be attributed to the multiple clientele served by the section. It is simply impossible to please everyone but, at the same time, you have to get along with them.

Where you've got the shop being a service organization, you're not only directly under /the public works superintendent/, but under direct fire from every other department head in the city -- you have to get along with everybody. I can't just make /the superintendent/ happy because then I'd step on the chief of police's toes . . . you have to deal with /the superintendent and his assistant and the sanitation section head, and four or five other water and street foremen, a couple of general foremen. Also you have to deal with the head of the water division and the electric department. You have all the general foremen and the subforemen there. In the telephone department you deal with the same chain of command there, and all the way down to the man on the vehicle.

These interdepartmental relationships, required by the section's responsibilities, are facilitated by the knowledge the garage foreman had acquired in the course of his twelve years with public works. He "can practically tell you the serial number on everything that the city owns," it was suggested. In addition, he had been employed for seven years in a similar capacity by The Alaska Railroad so that his experience in servicing equipment and satisfying the demands of others was extensive. The acquaintances and friendships which had developed through these nineteen years were helpful in his work relationships with other departments and organizations. Thus, borrowing supplies and equipment -- and lending in return -- takes place frequently between his section and The Alaska Railroad and the State Department of Highways, both of which are organizations maintaining large inventories of vehicular supplies. Similar working relationships exist between the equipment maintenance section and the local supply houses, the Army and the Civil Defense.

Intra- and interdepartmental relationships are not limited to exchange of supplies and equipment but include mutual aid in a more direct form. Particularly during the winter, men from the equipment maintenance section will provide assistance for other public works divisions like the water utility and for other city organizations like the telephone department. The water division, for example, may request help from the equipment maintenance section in thawing frozen pipes and performing other "normal emergency" operations.

Advice and suggestions are also exchanged between the equipment maintenance section and other city departments. The garage foreman's experience in maintenance apparently makes him something of an expert: it was reported that foremen and their men in other sections and divisions of public works and from other city departments consult with him informally about maintenance operations and decisions, although they take their more important problems, particularly those which involve departmental policy, to the public works superintendent.

Within the section the normal chain of command links the superintendent, as head of the maintenance division, with the garage foreman, and the latter, as section head, with his subforemen and mechanics. Policy orders, according to respondents, generally follow this pattern. Requests for maintenance and repair, however, come directly to the garage foreman without going through his supervisor. Thus, the director of public works or the city manager's secretary may occasionally call on the garage foreman when city automobiles need servicing, just as other section and division heads contact him with their maintenance requests. If mechanics or service men are asked by persons outside their section to make repairs, these requests are normally rerouted through one of the foremen. The only exceptions reported were those requests which are so minor as to require only a few minutes or those which are obviously routine, such as requests for fuel.

Deviation from the official procedure for requisitioning equipment and supplies is as normal in the equipment maintenance section as it is in many of the other sections of public works. Supplies may be obtained from the warehouse without the officially required papers; these can be sent later without disrupting the bookkeeping system. Such an informal approach to the requisitioning of equipment is also facilitated by the friendships which the garage foreman has made among the suppliers. As is true of the foremen in other sections of the public works, the garage foreman checks with his supervisor before authorizing any major expenditures; large purchases -- \$500 or more -- require official sanctioning before they can be made.

Sanitation Section

Of the three sections which make up the maintenance division, the sanitation section is the most independent. Normal operations of this section do not impinge on any other section or division within the public works -- as compared, for example, with the equipment maintenance section which involves every city department using vehicular equipment. The sanitation section is responsible for garbage pickup, has control of the city dump and junk car disposal, and is charged with the enforcement of sanitation ordinances

affecting junk yards, abandoned wells, and private litter. Each of these responsibilities is the concern of the sanitation section only and does not normally require a great deal of inter- or intradepartmental coordination.⁸

The section itself is composed of some twenty men who are organized under the general foreman and sanitation officer. Because the work is regular and its volume predictable and because the number of employees is apparently just adequate to the requirements of the work, there is little loaning of men to other sections and divisions, a pattern which characterizes sections like general maintenance and divisions like the water utility where emergencies and slack periods are more likely to occur. The sanitation section, however, does borrow men from general maintenance to serve as relief drivers when regular employees are unavailable.

The working day begins at 6:00 a.m. for the three men who drive the dumpster trucks and make the pickups in the business section of Anchorage. By leaving an hour earlier than the drivers and swampers assigned to residential collection, the men responsible for the daily business routes can be finished with their downtown work before the eight o'clock traffic begins. According to a member of the administration, the men who take the six o'clock routes are those who have demonstrated that they are capable of working on their own without direct supervision; thus, unless special dispatches require that the general foreman be there, he does not come to the garage until seven o'clock.

Once the seven o'clock crews have left, the members of the crews do not require any additional supervision from the general foreman, each driver and pair of swampers being responsible for the completion of their routes for the day. Normally these are finished by three or three-thirty in the afternoon. The general foreman spends most of his day with office work, although when he has time he assists the sanitation officer with his inspections. The entire city is too much for one man to inspect, and for this reason -- and because he has been unable to convince the city council that additional funds and an additional inspector are needed -- he tries to fill in the gaps in this operation. His office work, however, is so time-consuming that usually he does not have much opportunity to help the sanitation officer. The general foreman completes his work about an hour after the crews have finished, leaving his office at four or four-thirty.

The drivers of the five packer trucks act as the foremen of their two-man crews. Any decisions which must be made on the routes are made by the drivers. The crews are operated, said one respondent,

. . . on the premise that the truck driver on the truck is the crew foreman. In other words, he's responsible for himself, that truck, and that crew, and if he wants to work a man that isn't as good as he should be, then he's working a hardship on no one but himself because he's got to get out and help more. . . . What he says goes as far as the route business goes.

The basic priority established in this section, on which the drivers operate, is the necessity of completing the route. If this priority requires that the twelve-minute coffee breaks allowed in the morning and the afternoon be cut short or eliminated, this decision is the driver's. Business routes typically have a higher priority than residential pickups since the downtown collections must be made every day; residential pickups are weekly and thus can be left for a day "without hurting."

The present general foreman made a number of changes when he assumed his position, changes which, it was felt, have increased the efficiency of the operations. Routes were redrawn so as to eliminate the necessity of driving several miles for coffee breaks and lunch; the crews now make these stops in the course of their pickups. The crews were also given greater incentive to finish their collections by cutting the lunch hour to thirty minutes and allowing the men to go home whenever they completed their run in the afternoon.⁹ The result was an increased flexibility in the daily routine of the crews: on days when the work was going faster than usual, lunch and coffee breaks on the routes could be extended; on the other hand, when the work was heavier than normal, these could be abbreviated.

Unofficially, the crews are responsible during slack periods for stops which are not normally part of their routes. When this is done, it relieves the sanitation officer's work load. A respondent explained the usefulness of these extra stops.

If we're going down the street and we do see a mess that we've got time to clean up, why, we stop and clean it up rather than send a man /i.e., the sanitation officer/ out to tell the people to do it themselves.

Drivers vary in making these extra stops. One of the swamper, for example, indicated that his driver is especially interested in keeping a neat-looking route and will frequently stop to pick up a messy area instead of turning in a complaint. The driver is in charge of the route and the swamper has no choice in these stops. These load-packer crews will also stop to pick up overflow from dumpster cans on the business routes. The routes are covered by only one man to a truck; were he alone to attempt this extra work, his collection would be slowed down. Unofficially, the load-packer crews also keep a "scrounge box" on the back step of the trucks to take home anything that appears salvageable. "This practice," said one of the drivers, "is not looked on too well, but it's been done, I guess, since garbage men have been hauling garbage."

Like the other two section heads in the maintenance division, the general foreman of the sanitation section is responsible to the public works superintendent and his assistant. Most of the foreman's consultations, however, are with the general foreman of the maintenance section and with the assistant superintendent and assistant director of public works. These are relationships dictated less by the formal chain of command than by mutual

friendships and respect. The sanitation foreman and the general foreman of the general maintenance section are old friends, having worked together for the bureau of public roads before coming to the Anchorage Department of Public Works. And the sanitation foreman has considerable respect for the assistant director: the foreman appreciates the latter's practicality and training, and relies frequently on his opinion.

Both the sanitation foreman and the sanitation officer are "old-timers" with the public works: the foreman has worked there for eight years, the officer for eleven.¹⁰ Thus, the foreman is frequently sought out for unofficial advice and information by other members of the public works. If his reputation as an "old-timer" is responsible for good extra sectional relationships, his reputation as a "good guy" is responsible for good relationships within his section. Of his superior, one member of the section made the following comments which suggest some of the reasons for these friendly relationships.

He is the type of fellow that all the men highly respect. And I think that's why we have such a good department. He works real close with us and we just feel friendly to him as well as respect him.

And another said

Everybody feels free to talk to him. They aren't backwards or afraid to say what they want to say, because he will hear them out and do what is right.

The foreman is not consulted, however, on routine matters. Because the work of the section is largely repetitive, varying little from one day to the next, there are relatively few occasions when policy decisions arise which require the foreman's judgment.¹¹ He is consulted when personnel problems develop, such as differences of opinion between a driver and his crew or requests for transfer from one crew to another. In these situations the foreman is regarded as particularly effective by the members of his section -- so successful, in fact, that these situations are infrequent. In any case, "everybody feels free to talk to him."

The descending chain of command within the section is from the public works superintendent to the general foreman and to the sanitation officer and truck drivers. Only when the drivers are not available will the foreman give orders directly to the swampers; when the foreman is unavailable, the drivers receive dispatches from the superintendent or from the sanitation officer. Messages for the men on the routes are sometimes left with the woman who works in the record office at the city dump. Since the drivers gain their position by seniority, they make all the routine decisions on collections. As is true of other sections of the public works, persons who are missed when deviation from the normal chain of command occurs are informed of the order after the fact. No evidence of problems associated with these deviations, however, appears in the data.

Before coming to the sanitation section, the foreman had been a heavy equipment operator and had worked at one time or another in practically every public works division. His experience is understandably broad and, as already noted, he is frequently called upon to give advice and information. In addition to these extra sectional relationships, he has, as sanitation foreman, taken on a number of other unofficial tasks which bring him into contact with public organizations and with other city departments. He has, for example attended the meetings of the Anchorage Anti-Litter Committee and, whenever topics relevant to his work are discussed, meetings of the city council. He also maintains business relationships with the private contractors in Anchorage. The disposal of junk cars, organized by his section, is carried out by private companies contracted by the sanitation section.

Water Division

The water division was set up as a separate element of the public works in October of 1963. Prior to the establishment of this division, water treatment and supply, maintenance and repair of the systems, and customer service and billing had been scattered throughout a number of city departments. The greatest number of persons involved in these operations had been employed in the public works, notably in the maintenance division, although others were located in the engineering division. This "bits-and-pieces approach" was replaced by a unified division composed of three sections: customer services, treatment plant, and maintenance. Customer billing for the water utility, like the billing for garbage collection, was delegated to the city finance department and, until after the earthquake, all engineering for the water division continued to be done by the engineering division of public works.¹² Following a discussion of the normal activities of the water division, each of the three sections of this division is briefly discussed.

Manager

The manager is as new to the water division as the water division is itself new as a separate division. The six months from the division's beginning to the earthquake (October to March) were largely a period of organization and education for the manager. His activities during that time -- a combination of administrative paper work and field inspections -- sometimes required working as many as nine or ten hours a day. Nor were these activities scheduled in advance; as one member of the division indicated.

There's no set-time schedule. Some days /he will/ be in the field perhaps from six-thirty in the morning until ten o'clock. Other days, there may be a week when /he/ wouldn't be in the field at all. Perhaps one day, now and then, /he'd/ be out of the office practically all day, depending on what needs to be done in the field and what needs to be done in the office.

The educational function of these field trips for the manager was suggested in the following statement.

Normally when he's in the field, it's either going up to the water treatment plant to discuss problems that they may have there, or going out on projects just to see how they're being constructed. It's more as an education . . . to keep . . . up-to-date on what's happening, what we're doing, how our projects are going, rather than trying to be a coordinator or something like this.

Because the manager was new both to Anchorage and to the public works, this set him off from most other members of the division. His relative inexperience is probably an important explanation for the independence granted the other employees of the division. The manager occupied, during the months preceding the earthquake, a position of authority without exercising much of its decision-making power, relying instead on the greater knowledge of his foremen and the members of their crews for operational decisions. Indeed, it was suggested by a member of the division that all the way down the line the men of his division exercised more authority than would be typical of a similar department in another city.

We have Maintenance Men IV's, for instance, very often doing work that the foreman in the cities of the south forty-eight states should be doing. Our foremen are doing things that the general foreman should be doing. The general foreman is doing some of the things that the manager should be doing. If we get overloaded, we try to pass on as much as we can in order to get the job done. And it works right down. If the general foreman gets overloaded, the foremen end up with some of his work. And they're all flexible and capable enough to where they can handle this kind of setup.

Nonetheless, the manager attempts to keep himself informed of such activities, conferring periodically with the foreman without actually making decisions himself. "In many cases," a respondent said, "the manager was seeking their advice as to what to do, as well as in some cases they were seeking his." Only administrative, as opposed to operational decisions, such as the purchasing of supplies and equipment, are always made in the manager's office.

The range of the manager's administrative responsibilities is suggested by the priorities he established for his office: first, the collection and organization of material required for the weekly council meeting, and second, the solution of administrative problems affecting the work of the field crews. Replies to customer inquiries or complaints are also high on this list. These are not answered by the manager personally, but he does review them and suggest an appropriate answer before passing them on to the customer service section. Additional routine work, if it piles up, requires extra time at his office evenings or on weekends. In such work, he tries not to fall any farther than a week behind.

The manager's immediate supervisor is the director of public works. Normally, only policy decisions require consultation with the director; routine administrative decisions can be made independently, and decisions which involve, for example, the finance department can be made in collaboration with personnel of that department. The water division maintains a regular working relationship with the fire department as well. In addition to working directly with the fire crews at the scene of a fire, insuring water pressure and guarding against the danger of freezing, the water division also regularly maintains the more than 800 hydrants included in the local water system. The costs of this service, however, are charged to the fire department.

Relationships with organizations not part of the municipal system are somewhat less official. Mutual aid agreements link the water division with private utilities in areas surrounding Anchorage and also with nearby military installations. Equipment exchange, characteristic of other divisions of the public works, is also typical of the water division.

Customer Service Section

The customer service section of the division of water is responsible for inspection, meter reading, turn-on and turn-off duties, and surveys (the latter to insure that no unbilled use of city water occurs). The section is made up of three customer service representatives and one supervisor. Like his superior, the manager of the division, the supervisor of customer services is new to the water division. The supervisor, however, is not new to public works. He was transferred from the survey section of the engineering division, a work background hardly related to his position as customer service supervisor. Similarly, the three customer service representatives are new to their positions. Two were transferred from the public works labor pool and the third from the sanitation section of the maintenance division.¹³

The section functions as the link between the field crews of the water division's maintenance section and the office staff of the finance department which does the customer billing. Thus, the supervisor coordinates meter reading, water connections and disconnections, customer complaints, and the like.

The central focus of the section's work is the customer. Customer complaints are typically attended to before other more routine tasks. Indeed, meter reading and customer billing at times fall behind by a month as a result of the priority given to specific complaints. The irony is that this delay provokes additional complaints about late bills. Apparently this compounding of the problem has been alleviated, at least in part, by the hiring of new service personnel during 1964 and 1965.¹⁴

Officially, the general foreman of the water division is the immediate supervisor of the head of each of the three sections. However, it was suggested that unofficially the customer service and the treatment plant sections are completely independent. The general foreman was said to work almost totally with members of the maintenance section of the water division. Decisions not in the normal routine of the customer service section are discussed with the manager of the water division, not with the general foreman.

The customer service section works closely with the municipal light and power department, particularly when water connections are being made in new subdivisions in the area. Because both departments are involved in utility services and utility billing, efficiency is increased when these installations are made concurrently. This cooperation has been developed only since the water division was established in 1963; prior to that time "water was a sort of orphan and everybody had a piece of it" so that this coordination was structurally almost impossible. A similar relationship between the customer service section and the telephone department facilitates connection and billing consistency.

Treatment Plant Section

Anchorage receives its water supply from two sources. The major source, the surface water from Ship Creek, can deliver twelve million gallons per day to the treatment plant. The second source is a series of seven deep wells which together can supply as much as ten million gallons a day to the system. However, it is not feasible to operate all the wells simultaneously; they are supplementary, used only during periods of high demand or in the event of a break in the main supply line. The wells are also used during the winter when the Ship Creek water is extremely cold. By introducing the slightly warmer underground water into the system freeze-ups can be prevented.

The treatment plant section of the water division is responsible for the treatment plant itself -- for filtering and adding chlorine and fluoride to the water -- and also for the operation of the deep wells, because all but one must be manually controlled. The wells are used on a rotating basis and require periodic inspections and maintenance. The members of the section are on a seven-day, two-shift schedule; the foreman of the section lives at the treatment plant in order to provide the maximum security for the system.¹⁵

The treatment plant is automatic and the duties of the men who work there are simply inspection and instrument reading. Maintenance of the plant itself is also a part of the section's responsibilities. These activities, together with the maintenance and operation of the deep wells, vary little with the seasons except for special treatment which is required during the spring when the water tends to be turbid. A normal day's routine was described in the following statement:

On a normal day I'd come in at 8:00 in the morning and check the log -- we have a log right here -- to see what happened during the night shift and check the tests to see how everything is. I'd check the water, if we were treating . . . and make a check of all the instruments, charts, panels to see how the plant ran during the night. I'd check the boilers, check all of the equipment and pressures, filters, and lay out whatever work I wanted done for the day for the crew -- painting or cleaning.

Similarly, the operator in charge of the maintenance of the deep wells indicated that his work is routine. He keeps to a weekly schedule which takes him to each of the wells where inspection and repairs as needed are carried out.

The treatment plant is seven miles outside of Anchorage and is, apparently, not easily accessible. This physical separation accounts in part for the independence of the section from direct supervision by members of the public works administration. The work itself is routine enough not to require much supervision. In addition, the section includes a number of men who have been with the public works for a considerable length of time: the foreman and the operator in charge of the deep wells, for example, have each worked in the water system for eighteen years. And, as "old-timers," they are somewhat immune to direct supervision. "No one ever gives me an order," one of them said, "they know it won't go any farther. That's what's nice about being older. I can tell them to go jump in the lake." The other, too, observed that his section does not expect much supervision: "We're more or less self-contained here and we have to solve our own problems."

The status of the "old-timers" also allows them a degree of freedom from certain official paper work. A nice indication of how the section dealt with this problem is provided in the following:

They did start us out a long time ago with about five or six copies. We cut that down -- it got down to zero. These nonsensical things that don't amount to anything, we more or less eventually weeded them out. It'd be shoved to one side and we don't even bother with it because you can get into a lot of paper work which comes, to me, under the heading of "Useless Information" when they do get it.

Such paper work may be defined as unnecessary when, as is true in this instance, the men have been with the system since it began. They could recall when the water system consisted of one small pumping station and three men who were responsible for everything. Since that time, their job grew with the system: they are still responsible for almost everything. The result is that they, like other "old-timers" in the public works, are a source of information concerning the system which is unattainable anywhere else. At least from this perspective, then, the distinction between "useful" and "useless" information relative to this work is very clear: hence, their reaction to "unnecessary" paper work. On what is necessary, the following was adamantly stated: "But there's no short cuts for the actual work we do, because there's certain things that have to be done and that's that."

Normally, the work of the treatment plant section is self-contained: there is little need to coordinate with other sections and divisions of the public works or other city departments. On occasion, however, overlapping does take place. "Normal emergencies," such as power failures -- which "are

not unusual" -- may require that the foreman and members of his section work with the city electrical department. Similarly, when breaks occur in the water system, the treatment plant section may provide assistance to the maintenance section of the water division, and during the spring months, when additional treatment of the water supply is needed, the health department may become more involved than at other times in the water purification work of the section.

Because the foreman and a number of the operators have worked with the department for so long, they have established personal relationships with many of the other city employees. One of the operators, for example, is acquainted with most of the electricians, customer service representatives, and mechanics. As a result, he often receives requests from these men directly rather than through the foreman. He also knows almost everyone from whom he gets supplies: "I could walk into any place from here and say I wanted so-and-so and so-and-so and I get it without any if's or but's."

Maintenance Section

The maintenance section of the water division is made up of men who had formerly done this work within the maintenance division of the public works. According to one of the respondents, virtually all the permanent men of this section are "old-timers" in this respect. The section is made up of three foremen and, under them, some ten men who make up the crews. The general foreman, officially the supervisor of the heads of all three of the sections of the water division, works most closely, if not completely, with the foremen in the maintenance section. He is assisted by the senior foreman, an unofficial position which is filled by the foreman who has been with the public works for the longest period of time. As is true of the general maintenance section of the maintenance division, a number of the members of the crews are designated as "lead men," and, like the position of senior foreman, these positions are filled on the basis of seniority.

The tasks of this section are maintenance and repair, although a limited amount of installation and connection work is done by the crews during the summer. Most actual construction, however, is contracted to private companies and is supervised, as is all work done for the city, by inspectors of the construction section of the division of engineering. One of the water maintenance foremen said that he does, nonetheless, periodically check up on the private contractors when they are engaged in work for the water division. "I have been talked to a number of times," he said, "for butting my nose in where it didn't belong, but I still felt I should." This inspection is unofficial because the principal task of the foremen of this section is the supervision of their own maintenance crews, a task which keeps them in the field most of the time working with the hydrants, the water mains, valves, and the like.

The men are not assigned to any one of the foremen on a permanent basis but are shifted around depending on the work which needs to be done. A degree of specialization does exist among the foremen, however. The senior foreman has had considerable experience in making water connections and he and his crews are generally dispatched when this work is required. This task

specialization necessarily precludes regular geographical assignments of the type found in the general maintenance section of the maintenance division. One of the members of the crews made a somewhat critical observation on these assignment procedures in which he suggested that the shifting of men and foremen sometimes results in confusion among the men.

If you're on a job and you're working for one foreman, then he should be the only one you work for. This is not so in the water division. And I don't think the system works out too good, personally. Frankly, I think a man can only work for one person -- in an emergency or other wise -- because if you start having two or three men giving orders things are bound to get fouled up down the line. . . . One foreman might have told you to go someplace and then the other one would call you and tell you to meet him so-and-so or go do something. Well, you're supposed to be on one job and you're not there, and they wonder what you're doing. That's the difficulties you run into.

The general foreman of the water division is consulted by the three foremen of the maintenance section principally when decisions of a nonroutine nature must be made. In normal operations the general foreman is less a decision maker than a coordinator, concerned primarily with the efficiency of the maintenance and repair operations. Thus, most operational decisions are made by the foremen or, in the absence of the foremen, by the lead men of the crews. Frequent "normal emergency" work -- breaks in the water mains, for example -- and the considerable experience of many of the crew members make for considerable delegation of authority in decision making. One of the crew members described these conditions this way:

The bigger decisions come from upstairs, usually through the water utility manager. Then the foremen make some of the decisions there at the shop and then sometimes the men make the decisions on the job because problems arise. . . . The foreman can't be there to determine everything and when he's got two or three crews working, he can't be everywhere at once . . . so quite often it's left up to the men to make the decisions in the field.

He continued by citing more specifically the conditions under which members of the crew might make operational decisions themselves.

A lot of times you have to make the decision in the field. You have to make it quick. You can't run here and there to see about it because you might be flooding somebody out or you might be endangering property or something of that sort. So you have

to make decisions, do something, sometimes even if it's wrong.

Allowing the men to work largely on their own is particularly necessary in this section because the work is often of an emergency nature. Of this one foreman said: "Earthquakes or not, you're going to have broken lines." Under these conditions, a foreman cannot expect to supervise all of his men directly.

Nonemergency decisions, decisions which can be postponed without resulting in property damage or a lengthy disruption in service, are held for the general foreman or the crew foremen to make at the end of the day. Unofficially, decisions are sometimes made by the foremen in consultation with other city employees or with members of private organizations involved in city work. Thus, the senior foreman regularly discusses maintenance and repairs with the construction men contracted by the city for work on the water system. It was also indicated that quite often these men come to the section unofficially. The senior foreman himself is also consulted, informally, by the other two foremen in the section. His longer experience as a foreman and greater knowledge of the city's water system make him a reliable source of advice and specific information.

On occasion foremen from outside the maintenance section will make requests of the crews without contacting the crew foremen. When this happens, according to one of the crew members, these requests are either ignored altogether or those making the request are asked to check with the crew foreman. This problem was more pronounced when the water crews were still part of the maintenance division; one of the street foremen was particularly notorious for this breach of standard procedure and was often reminded of it by the water foreman. Since the water crews have become part of a separate division, the problem has been somewhat alleviated.

The work of the maintenance section frequently impinges on other divisions of public works and on certain city departments; consequently the section is more often involved in the work of these departments than are the other sections of the water division. A certain base for these extra divisional relationships had already been laid by the previous "bits-and-pieces" arrangement of the water personnel. Many of the men in the maintenance section know employees in other divisions and city organizations because they had worked with them before. "One reason that we get along so well," said a foreman, "is that we used to be part of those organizations." In the normal course of their work, the maintenance personnel contact the fire and police departments to inform them of hydrants and streets being closed for repairs, the traffic engineer to set up detours and road blocks, the gas company and the telephone department to check exposed lines and cables, and the maintenance division to aid in making and filling excavations.

In addition, members of the water crews pass on information to other sections and divisions when they see conditions which require attention. The location of malfunctioning traffic lights or fallen street signs, manhole

covers which have been removed, and similar information can be left with the appropriate office without undue effort. "I feel that I'm not just working for the water department," said one of the foremen, "but that I'm working for the city of Anchorage -- it all comes out of the same pocket actually."

The senior foreman of the maintenance section is an experienced man in his official position in the water division. He is regarded as "one of the boys" more consistently than any of the other foremen in the organization. His informal position and his considerable work experience together probably account for the influence which his opinion carries in the department, for he is, as one of his colleagues put it, "the sort that could change a superior's decision fairly easily." In addition, he is a close friend of the assistant director of public works, having worked closely with him before the organization of the water division. He, the more experienced of the other crew foremen, and the general foreman work well together.

Division of Traffic Engineering

The division of traffic engineering is one of three small divisions which, together with the large engineering, maintenance, and water divisions, make up the Anchorage Department of Public Works. The division includes five persons, plus the traffic engineer and his assistant who supervise the division. The responsibilities of the division range from the design, installation, and maintenance of traffic signs and signals, crosswalks and center-line markings, to the compilation and analysis of accident records and the tabulation of traffic counts. In addition, the division is responsible for a daily check of the nearly two thousand parking meters owned by the city. Almost the same number of street lights is maintained by the division, although the municipal light and power is responsible for their installation.

The work of the traffic engineering division is actually more closely associated with city and state departments entirely outside the public works than with divisions within the public works. Practically all the activities of the division involve either the police department or the municipal light and power, that is, either traffic regulations or the installation of signals. The division also works frequently with the city manager's office and with the state department of highways. With the latter department, the association is both official and unofficial; on the one hand, certain coordination is required if the flow of traffic is to be orderly and efficient, and, on the other, courtesy suggests that the members of the division should check with their counterparts in the state department periodically -- "You never know when you might have overlooked something." Only when the division works with the maintenance division of the public works, is extensive intraorganizational contact demanded but, according to one member of the traffic engineering division, even this can be accomplished without necessarily involving the administration of public works. One can go directly to the public works superintendent as head of the maintenance division or through the general foreman of that division.

The bulk of the routine administration of the division -- the "leg work" -- has been passed down from the traffic engineer to his assistant. One respondent noted, for example, that this "has gotten to the point where he

even signs as department head on requisitions and other types of authorizations when /the traffic engineer/ is out." That his signature has never been questioned leads the assistant to conclude that he is not overstepping his own authority in this practice. His normal activities are, thus, closely associated with the work of the traffic engineer. Prior to the earthquake, the department had been in the process of planning for and acquiring property in the downtown area to provide additional off-street parking. About half of the assistant's time was spent on these and related plans for equipping five more intersections with electric signals.

If this division is at least as autonomous as some of the other in public works, this independence is here more actively sought than elsewhere. It is difficult, however, to determine the extent to which this independence is a function of the kind of work the division does, the push for greater autonomy by the traffic engineer, or the relatively fluid history of the division itself. One member of the division suggested, for example, that because "things /in Anchorage/ are still in a state of flux" the traffic engineer finds it easy to continue the process of separation. "In an established city in the southern forty-eight," he continued,

where for the last fifty years the division of traffic engineering has had its slot right there, he could never go in there in a period of three years and wrench it out and make it a new organization. So this is possible only because of the fact that the city of Anchorage is not that well established -- it hasn't been around that long.

In addition, the high rate of employee turnover breaks down one of the forces which tends to reinforce continuity in organizations. "Nobody is around who says, 'Well, twenty years ago it was like that: what was wrong with it then?'"

Division of Building Inspection

The division of building inspection is the second of the three small divisions included in the public works department prior to the earthquake. Like the division of traffic engineering, it was made a separate department of the city late in 1964. At Time One it was made up of ten persons. The head of the division was the chief building inspector, assisted by the plan checker. The other members of the division, the condemnation officer, two building inspectors, an electrical inspector, a gas inspector, a plumbing inspector, and two clerks, were responsible to the chief building inspector and his assistant.

The Annual Budget (1964) described the activities of this division in the following statement:

The Building Inspection Division is responsible for handling and processing all permits for building inspection or alteration, work in the public rights-of-way, sewer and water connection applications,

moving permits and miscellaneous permit administration connected with the Public Works Department. Inspection services are performed on all the above work and in addition inspections are performed on plumbing, electrical and gas installations. Routine yearly license inspection is a function of this division and also approval of new business licenses; house numbering is also referred to this division. In addition, an active condemnation program is being followed with one man devoting full time to this activity. This Division is responsible for the enforcement of the Zoning Ordinance and works in close cooperation with the Planning Department and with the Board of Examiners and Appeals with appropriate public hearings, and the Board of Gas Fitters' Examiners and Appeals who are responsible for the examinations and licensing of Gas Fitters.¹⁶

Like the division of traffic engineering, the building inspection division is infrequently associated with other divisions of the public works. More often this division works through the police department -- as in the issuing of summonses and the like -- or with the fire department. Most frequently contact is with the city planning department, although a certain amount of liaison work is also carried on between the building inspection division, the municipal light and power company, and the gas company. In fact, the director of public works, according to the one member of the building inspection division, "knows very little of the building inspection workings that go on." As a consequence, at least during normal times, the director is not involved in the operations of the division.

Within the division, despite a certain degree of specialization -- the plumbing, electrical, and gas inspectors, for example -- considerable overlapping of activities and authority exists. The plan checker may exercise much of the authority of the chief building inspector when the latter is not available. And among the inspectors similar patterns occur; when one man is on vacation or ill, others in the division are prepared to take over the responsibilities of the vacant position. In addition, some inspectors are avoided by persons who frequently require the services of the division; inspectors with friendlier dispositions and more favorable reputations are sought instead. Because the division works face-to-face with the public, such public relations considerations take on increased importance in this division.

Conclusions

This discussion of the normal operations of the public works has sought to demonstrate that the organization is plural. It is less a coherent, single entity than a collection of varying independent parts, some linked rather closely, both officially and unofficially, with each other and with the

administration, and others, virtually autonomous. The survey, design, and construction sections of the engineering division are probably the most coherent elements of the organization. Others, like the equipment maintenance and sanitation sections of the maintenance division, function as relatively autonomous units through the tasks they perform; and still others have achieved similar independence through the activities of the men who lead them. Of the latter, probably the building construction and maintenance section of the engineering division and the traffic engineering division are the clearest examples. The building inspection division is often simply ignored. The treatment plant section of the water division and the division of airports are physically removed from the rest of the organization and relatively self-sufficient.

Another factor which appears to be associated with the relative independence of certain divisions and sections of the public works is the extent to which their normal responsibilities involve them with organizations outside the public works proper. Thus, the traffic engineering and the building inspection divisions, more often than other elements of the public works, are associated with city and state agencies separate from their parent organization. Similarly, the financial dependence of the municipal airport on the federal government -- as well as its physical distance from the public works offices -- contributes to its autonomy.

If it is true that crisis situations intensify organizational strains which are normally ignored, if not unnoticed, then this imminent fragmentation of the Anchorage Department of Public Works might be expected to emerge explicitly in its reaction to the earthquake. This, in fact, is one of the central themes of chapters four and five of this monograph.

FOOTNOTES: Chapter III

1. City of Anchorage, Annual Budget, City of Anchorage, for the Year 1964, compiled and submitted by Robert H. Oldland, City Manager (Anchorage: October 29, 1963), p. 185.
2. Ibid., p. 192.
3. Ibid., p. 201.
4. Ibid., p. 200.
5. See William A. Anderson, Disaster and Organizational Change: A Study of the Long-Range Consequences in Anchorage of the 1964 Alaskan Earthquake, Disaster Research Center Monograph Series (Columbus: Disaster Research Center, The Ohio State University, 1969), for additional information on this post-disaster change.
6. At Time One some difficulties existed between the garage foreman and the public works administration. The exact situation cannot be reconstructed from the data available (no interview was conducted with this foreman), but during the emergency period the foreman and the department officially parted company. His position was temporarily filled by the day subforeman; the latter eventually accepted the position permanently. In this and subsequent discussion the garage foreman referred to is the former subforeman.
7. Annual Budget 1963, n.p.
8. The one exception to this statement is customer billing, a task which was part of the responsibility of the sanitation section but which in 1963 was turned over to utility billing in the city finance department.
9. The task incentive program, which would have made official this kind of operation, had not been adopted at Time One, but a campaign for the adoption of the program was underway.
10. The sanitation officer, however, was only promoted to that position during the earthquake. He had been a driver. For an extended discussion of this personnel change during Time Two, see chap. 5.
11. Thus one member of the section said:

In our department when you come to work, you know your route that you're going to pick up that day and it's just come and get your truck out and go. You don't have to receive any particular orders. The supervisor doesn't have to come and tell you it's time to work. . . . You might not even see him.

12. For a discussion of the post-disaster changes in this arrangement see Anderson, Disaster and Organizational Change.
13. It is not clear from the data whether these men had done customer service work in their own previous positions or whether it was entirely new.
14. The exact number of additional men is somewhat difficult to establish since the available information is contradictory. The customer service supervisor indicated that he had three new men; the annual budgets for 1964 and 1965 list only one.
15. All of this information is derived from the Annual Budget 1964, pp. 327-328.
16. Annual Budget 1964, p. 244.

CHAPTER IV

TIME TWO: TASKS

In this chapter the emergency tasks of public works personnel are described. The typology of organizational response to disasters introduced in chapter one is incorporated in this discussion. The use of this analytical device will provide a framework in which the similarities and differences of response among public works employees can be more clearly described than would be possible following the formal structural divisions outlined in chapter two.

Thus, public works personnel are here discussed in three functional categories. The breakdown follows a typology which will be discussed in detail in a later chapter. However, to give readers an indication of focus, table 1 abstractly depicts, according to their structure and tasks, the four major types of organizations or groups involved in the typology.

TABLE 1

TASKS

S T R U C T U R E S	Established	Regular	Nonregular
		Type I	Type III
	Emergent	Type II	Type IV

According to our analysis the functional units of the public works organization fall into the following parallel cells:

Maintenance personnel	Engineering personnel
	Emergent engineering group

Following a description of the engineering personnel, whose Time Two (figure 3) characteristics approach the Type III organizations of the typology, the tasks of the maintenance personnel are considered. These public works personnel correspond to the typology's Type I organizations which

include among their normal activities certain preparations for emergencies. Finally, the service and administrative personnel are considered. This portion of the chapter includes a discussion of the customer service section of the water division, the sanitation section of the division of maintenance, and the administrative and office personnel of the public works. The place of these service and administrative groups in the typology formulation is somewhat ambiguous and this ambiguity is considered in detail in the last chapter of this monograph.

As was indicated in chapter one, the emergent engineering group (which would fall under the Type IV classification of the typology), is discussed within the context of the engineering personnel. No consideration of that group as a peculiar type will be presented until chapter six of the monograph. Similarly, the principal distinguishing characteristic of the maintenance and engineering groups as Types I and III respectively will be discussed in the final chapter.

Engineering

The engineering function of the Anchorage Department of Public Works places the highest priorities on tasks associated with the design and construction of municipal structures, streets, and utility systems. The division of labor is officially defined by the very structure of the engineering division, i.e., by the distinctions among the survey, design, construction, and maintenance sections of that division. The personnel of these sections may be said to participate successively in the completion of tasks. Beginning with the survey of possible locations and the drawing of designs and specifications, the tasks progress through the letting of contract and supervision of the actual construction to, in the case of public buildings, periodic inspection and regular maintenance. With the exception of the latter tasks, the process is largely self-contained, that is, it does not overlap significantly with the maintenance function of the public works.

Traffic engineering serves a similar, and almost as total function, in a more limited area of public facilities. Described in chapter three, the tasks of this division of the public works range from the design to the maintenance of signals and other devices associated with traffic control in the city. The other engineering division, building inspection, has purely regulatory tasks, as it is charged with the supervision and control of all construction and alteration undertaken in the city.

Given these normal task priorities, the personnel engaged in survey and design were affected by the earthquake only indirectly. Their principal contribution to the disaster effort came considerably after the emergency period when, together with the Army Corps of Engineers, they began the massive job of reconstruction. Those personnel in the engineering divisions assigned to inspection, and especially to condemnation procedures, were more immediately involved after the earthquake. But the most immediate demands were placed on those who were less engineers than maintenance and repairmen, i.e., certain members of the building construction and maintenance section.

For many employees of the public works, particularly those in supervisory positions, the simplest operational priority, under which they can place all of their specific tasks, is "public service." Thus, during the immediate emergency period, supervisors responded to the situation in terms of this general definition by taking on new tasks to replace normal activities made irrelevant by the disaster. They would not have performed these new tasks in normal times, but in this unusual circumstance, these tasks were seen as necessary to protect the public and its property and to restore vital community services. As a result, considerable discontinuity between Time One and Time Two tasks existed for these engineers; their disaster tasks often bore little resemblance to their normal responsibilities. For other members of the engineering division, all continuity was lost and they were apparently left with no relevant task priorities at all.

Survey and Design Sections

That the highest priority following a disaster is placed on the preservation of human life and essential services is suggested by the immediate activities of the heads of the survey and the design sections of the engineering division. The head of the design section, for example, became involved in transporting medical supplies to one of the Anchorage hospitals. His counterpart in the survey section, although he probably knew as much about radio electronics as the head of the design section knew of medicine, found the necessary help and took an emergency generator out to the remote transmitter which had lost power as a result of the earthquake. These activities were undertaken, not because either of the men was prepared by experience or training, but simply because the tasks had to be done.

During the following two days of the emergency period the men were somewhat less out of their element, but still had not returned to Time One tasks. On Saturday the head of the design section worked with a group of geologists who were assessing the land movements in the city. And on Sunday he and his assistant organized four-man teams and joined in the damage survey of the sewer system. The head of the survey section had begun this same process independently on Friday night, and by Sunday he had some ten men working under his direction. The availability of city utility maps in his office apparently increased to some extent the efficiency of his operation, but the personnel involved were not necessarily experienced in the work. It was said:

Occasionally /we'd/ been able to pick up somebody else around that was not overly busy. . . . Well, we'd go out and bang away at it. We went around drawing these lines on these maps. If I saw a manhole that I could get at easily, why, I'd bang it open and I'd note whether the sewer was flowing or not flowing.

The design and the survey heads were each aware that they were not working alone in checking the sewer system, but neither was certain during the two days of the emergency period exactly who else was involved.

There were other people doing it, one man realized, that was obvious -- in fact, some of the manholes had been opened. But it was a matter of a day or two days before I was aware of who was operating.

The additional teams were from the maintenance division, which by normal task priorities and experience in the public works was officially charged with responsibility for the sewers. This duplication of efforts during the emergency period will be discussed in more detail in the next chapter.

No one told the design or the survey head to perform these tasks. The inspections and other jobs they undertook were impromptu but necessary activities at the time; the two engineering heads continued to perform them until it was clear that other members of the public works, more adequately prepared, were capable of taking over completely. But for other members of these two engineering sections the imperative to act was somewhat less categorical. Two of these employees said that they heard a radio announcement urging the public not to attempt to reach downtown Anchorage; they did not. They reported to work on Sunday. Another employee, who arrived at his office Friday evening, saw one of the head engineers who told him there was nothing to do. He went home until called back to work Sunday afternoon. Another engineer worked for three or four hours the day after the earthquake, assisting in the location and checking of gas valves. He returned home that afternoon and did not report for work until Monday morning, a day and a half later. Given the irrelevancy of their normal tasks to the activities of the emergency period, these engineers probably defined themselves as unnecessary members of the public works during this period. Supervisors, on the other hand, typically operate under comparatively general job descriptions which may have contributed to their willingness to take on totally new tasks. In any case, as official leaders they probably felt they should be present.

Traffic Engineering Division

The normal tasks of the members of the traffic engineering division, like those of the survey and design sections, were not required during the emergency period. Indeed, the head of the traffic division was with the National Guard at the time of the earthquake and served in the organization through Saturday morning. The only immediate physical action taken during the emergency by the division was the removal of downtown parking meters and traffic signals, particularly those which were hazardous to public safety. At the same time, a survey of the damage to the traffic control system was undertaken, but only on the following Monday were any actual salvage operations or repairs begun by members of the division. The assistant traffic engineer worked Saturday morning, supervising the placement of barricades around slide areas which the Army had not yet cordoned off. He did not return to work again until Monday morning because there was nothing for him to do as a traffic engineer.

Construction Section

After some immediate work Friday night in providing emergency power for certain "key organizations," the head of the construction section of the engineering division began organizing the equipment pool, a project which was to occupy him throughout the emergency period. This was to be the major source of heavy equipment during the disaster operations. It was set up in a strip of municipal park at 9th Avenue and C Street, four blocks southeast of the City Hall Annex. From this point, trucks and other equipment loaned, borrowed, and donated by private contractors and state agencies were dispatched. The head of the construction section served as supervisor of this equipment center during its operation. Like the heads of the survey and design sections, he took on this task because it needed to be done. But he was better prepared for his new job than his colleagues were for theirs.

/He/ was probably in a better position than anyone in the city to know where this equipment was because /he/ works with these people all the time. . . . /He has/ a list of contractors' emergency numbers and knows how to get a hold of these people. So usually anyone that needed a piece of equipment that wasn't available would call /him/ and /he/ would line them up on where to get it or make an effort to get it for them.

The construction section head also became involved in the sewage system operations, not in the inspection and damage assessment, but in the emergency repairs which were tentatively begun the day after the earthquake. This work, like supervision of the equipment pool, was linked with his Time One activities by his knowledge of private contractors in Anchorage. Much of the emergency work on the sewers was, in fact, done by local contractors. They worked on a semivoluntary basis as contracts obviously could not be drawn up at the time of the emergency; they were, however, subsequently reimbursed for their services. Because the head of the construction section knew the contractors, he was an important source of contact with them for the public works during this period. He, together with the head of the survey section and the sewer foreman of the maintenance division (a position created during the emergency period) shared the responsibility of coordinating the immediate repairs to the sewer system. The head of the construction section took charge of the work done by private contractors, leaving the supervision of the public works crews to the maintenance foreman, and the inspection of the system to the heads of the survey and design section.

Building Construction and Maintenance Section

The head of the building construction and maintenance section also enlarged the scope of his normal activities to include a number of new tasks demanded by emergency. The most immediate of the new tasks was search and rescue, a necessary activity which, however, is normally not the concern of any one group, at least on a large scale.¹ Those who participated in this

activity were provided with police department symbols, armbands improvised from torn-up sheets with "police" written on them.

Through these emergency activities the head of the building construction and maintenance section emerged as the coordinator of a variety of disaster operations during the weekend of the earthquake. He emerged, in fact, as the head of a new and almost completely independent group which detached itself from the public works and stood somewhere between that department and emergency organizations such as the police. Unlike the supervisors of the other engineering sections who, although they assumed new tasks, continued to operate with their colleagues in the public works, the head of the building construction and maintenance section took on broad information-gathering and coordinating tasks which placed him outside the context of the public works. Those who made up the core of this new group -- variously self-labeled as the "Disaster Desk," "Damage Control," and, most frequently, the "Disaster Control Office" -- were drawn from the building construction and maintenance section and from outside the public works altogether.

During the first night of the emergency, this group organized and dispatched search-and-rescue teams which checked for trapped persons, secured buildings, and began the process of removing hazards from damaged buildings. Before the emergency period was over, the Disaster Control Office had expanded its activities to include the dispatching of both light rescue and heavy duty demolition and security teams, the operation of a transportation pool, the beginnings of an equipment depot, the establishment of three shelters for those made homeless by the earthquake, and the development of a central office gathering and providing disaster information. The group also commandeered a service station across the street from the Public Safety Building, dispensed gasoline, and made tentative steps in the direction of providing for emergency water and sanitation facilities for the Public Safety Building. One member of this new group said:

I remarked sometime Saturday morning that I had never done such a variety of things in such a short period of time. And we all did. We wore as many hats as we could possibly get on our heads.

The Disaster Control Office began with the personnel of the building construction and maintenance section, but during its brief existence, it absorbed not only several hundred volunteers (estimates ran as high as seven hundred) but also two established rescue groups -- one associated with the Army and the other a civilian mountain-climbing group. Within the public works, the Disaster Control Office incorporated the personnel of the building inspection division, including the head of that division. The core of the new organization, however, remained the members of the building construction and maintenance section plus an additional four persons from outside the public works who were friends of the head of that section.

Despite the great range of activities undertaken by the members of the Disaster Control Office, there was one which emerged as basic to all their operations. This most important single function was coordination. In the

absence of any clearly defined emergency coordinating body, the members of the Disaster Control Office assumed that task and, as a consequence created a totally new organization.² The coordinating task which they assumed involved not only the various sections of the public works, but also virtually all other municipal and private groups which responded to the disaster. Thus, the Disaster Control Office took on the task of coordinating interorganizational as well as intraorganizational activities. No plans existed before the earthquake to suggest that the building construction and maintenance section should assume this task. The process was, to that extent, "natural." One member of the section suggested that what they did was different only in degree from the activities of other engineers. He described the situation this way:

All of the unit heads came to work of their own volition because they thought, "Well, you know something's got to be done. Here I am. Let's go." They were not told what to do; they were not directed. They had no standing orders to report. But they just reported and then carried on. This was especially true in this damage control unit. . . . What we did was probably the regular assignment of the civil defense, and in their absence we moved out and did it.

Nonetheless, the head of the building construction and maintenance section could see some continuity between his normal responsibilities and those he assumed during the emergency. Like the head of the construction section, whose normal associations with private contractors provided him with valuable information concerning available resources outside the public works, the building construction and maintenance head felt that his Time One assignment to "buildings and structures" had prepared him for the tasks he took on at Time Two. In the following statement these new responsibilities were described by a member of his section.

We were operating with some degree of efficiency and I'll say that this damage control group was probably operating more decisively than anyone else with the exception of the utilities. . . . We don't fit into the normal routine of public works things: We have nothing to do with street work, storm drains or sewers or anything like that, but are fully concerned with buildings and structures. So this was a sort of natural thing for us to do. We seem to be able to just grab hold where there are loose ends . . . and that's what we did.

The difficulty of some engineering personnel -- especially those not in supervisory positions -- finding something to do in a situation which made their normal tasks irrelevant was not characteristic of the members of the building construction and maintenance section. With the exception of the head of the section, all the employees were maintenance men rather than engineers. Their maintenance and repair responsibilities (for plumbing,

heating, carpentry, and the like in public buildings) were easily transferred in the emergency to any building which had been damaged by the earthquake. Apparently there was little ambiguity for these men in defining their extended responsibilities. Each of the repairmen in the section became, according to one respondent, a foreman in charge of a team of volunteers, working efficiently and independently, much as they had done in Time One. For other personnel of the engineering division, demands for normal activities -- for copies of utility and street maps, assistance in survey and inspection projects, for example -- were not felt immediately following the earthquake. Not until Sunday and Monday were the office tasks which were normally performed by many of these men required and, in the interim, there was nothing for them to do.

In terms of its tasks and of its personnel, the building construction and maintenance section was not an engineering unit. It was, instead, maintenance oriented, an orientation immediately relevant to the disaster. The normal tasks of the members of the division of building inspection, too, were quickly transferable to the disaster environment. The Time One experience of the personnel of this division provided them with skills which were immediately useful in the search-and-rescue operations. As a result, members of this division became members of the Disaster Control Office and were coordinated by the head of the building construction and maintenance section.

Maintenance

The contrast between the Time Two tasks of the engineering and the maintenance divisions of the public works is suggested by a pair of statements frequently repeated by members of these divisions. Describing what they did during the emergency period, engineering personnel were likely to say: "We saw what had to be done, and we did it." Personnel in the maintenance sections, however, significantly altered their version of this comment. "We knew what had to be done, and we did it." This change points to the major source of variations among the sections of the public works, not only in Time Two tasks, but also in patterns of authority, decision making, and communication during the post-disaster period. Engineers generally took on new tasks; maintenance personnel simply continued with their normal tasks. More properly, the effects of the earthquake demanded qualitative changes in the tasks of engineering employees, but only quantitative changes among the maintenance sections. In this sense, it may be appropriate to call the earthquake a "disaster" for engineers, but an "emergency" for the maintenance. Further discussion of this distinction will be presented in chapter six.

Those sections of the public works which are normally assigned maintenance functions include the general maintenance and equipment maintenance sections of the maintenance division, the treatment plant and maintenance sections of the water division, and the personnel of the division of airports. The personnel of these sections are responsible for the maintenance and repair of city streets and sewers, of trucks and other mechanical equipment owned by the city, of the water treatment and distributive systems, and of the city-operated air field. These public facilities were most seriously damaged by the earthquake and, particularly in the case of the streets, sewers, and

water systems, these facilities are defined as "essential" to the welfare of the community. For the personnel of these sections, then, the effects of the earthquake created demands for tasks which were both continuous with Time One and ascribed high priority by the community during the emergency period. The result was relatively rapid mobilization within these sections and immediate attention to familiar tasks.

General Maintenance Section

For members of the streets crews -- the maintenance men, the three foremen, and the general foreman -- the task of opening streets blocked by debris and disrupted by the ground dislocations began during the hours immediately following the earthquake. The work done on Friday night, however, was somewhat uncoordinated. Men available and experienced in the operation of heavy earth-moving equipment were dispatched, or, in some instances, simply took upon themselves to open city streets they knew were blocked. Other members of the crews helped the police set up barricades around the most heavily damaged areas. Early the following morning, with crews considerably augmented by volunteers from private contractors and with additional trucks and other equipment donated by the state department and local construction companies, the street repairs began more systematically.

The impetus for the emergency repairs was the threat of fires -- a threat which never materialized, but which required the temporary construction of fire lanes against the possibility. The repairs were accomplished by leveling the outcroppings and filling the depressions with gravel. By the Monday following the earthquake the emergency repairs were completed; only certain faults had to be refilled as a result of the packing and settling of the gravel. Streets were most severely damaged in the downtown areas of Anchorage and in the Turnagain residential section, and these received the immediate attention of the street crews. The massive project was completed in two days, largely because the ranks of city personnel were swelled to one hundred by construction workers from private businesses. Estimates of the amount of equipment volunteered for use in these repairs vary, but apparently something like sixty-five or seventy trucks and about ten loaders were added.

The general foreman assumed the initial responsibility for dispatching the city crews and the volunteers, but later delegated this task to one of the street foremen. When the latter was placed in charge of the sewer repairs on Sunday, the foreman of the sanitation section took his place as dispatcher. The other two street foremen were in the field, one directing the operations at the gravel pit, the other at the areas under repair. These foremen were joined by three of the leadmen from the street crews who were promoted to the position of foreman during the emergency period. The gravel-fill operations were begun at five o'clock Saturday morning; the men worked from that time, both Saturday and Sunday, until dark, and the completion of this project by Monday coincided with the end of what has been called the "emergency period." Comparing the work undertaken during these two days with the tasks of Time One, a member of the general maintenance section said, "Well, there was just an awful lot more to do. I'd say a hundred times more

to do than we would ever run into in any normal maintenance day." And, making the same observation of quantitative change in task demands, one of the street foremen suggested that during the emergency period he was faced with the "same work, only a lot more of it."

In addition to their normal tasks of maintaining the city streets, members of the general maintenance section are also responsible for the operations of the sewer systems in Anchorage. Normally, the maintenance of the storm and sanitary sewers is delegated to the crews by their assignment to sections of the city, each of the three foremen and their men being responsible for streets and sewers in one part of Anchorage. Considerable duplication occurred, however, in the inspection of the sewage systems immediately following the earthquake. The supervisors of the survey, design, and to a more limited extent, the construction sections were all involved in the initial stages of this project and, until Sunday afternoon, little coordination existed in their activities.

The general maintenance foreman, who had been made the nominal supervisor of all sewer activities in his section only a month before the earthquake, dispatched men on the gravel haul until Sunday afternoon. At 3:00 p.m., however, he, together with the general foreman of the maintenance division and the director of public works, met to discuss the situation. It was suggested, apparently in an attempt to bring some order to the inspection and restoration of the sewage systems, that the sewer foreman should take operational charge of all activities and personnel associated with that project. This new authority, however, did not preclude the assistance of public works personnel from outside the general maintenance section. At the request of the sewer foreman, the head of the construction section became more actively involved in this project than he had been.

To a certain extent, the initial difficulty in coordinating sewer inspections and the necessity of calling in outside help once coordination was established were both functions of the sewer system itself. The sewers required extensive inspection and mapping before breaks could be located and appropriate temporary repairs made. In a paper describing this inspection and repair process, two consulting engineers hired by the city made the following comparison of the difficulties in assessing the damage to the sewage and water system.

The location of damage and the delineation of repair methods for sewer restoration was a project of more complexity than was the case with the water distribution system. Damage to sewers was not confined to slide areas, nor was it obvious at the ground surface as was often the case with water main breaks. In order to define the location and nature of individual line breaks, photographic and direct visual inspection of the sewers was required.³

These difficulties were compounded by the absence of complete maps of sewage-system connections and installations, some of which had been built by private contractors for housing developments and only purchased by the city later. The early inspection work, as a result, was largely improvised and was necessarily somewhat haphazard. The early difficulties in coordination and the changes in authority which followed the official appointment of the sewer foreman will be discussed in greater detail in the next chapter.

Equipment Maintenance Section

Of the equipment maintenance section, as it had of the general maintenance section, the emergency demanded a quantitative rather than a qualitative change in tasks. Despite the increase in the number of vehicles which they serviced and repaired -- all private equipment used on city projects were fueled and maintained by the city garage -- the number of section personnel were sufficient to handle the extended tasks. Only three additional persons were involved in emergency operations: three boys who volunteered to help restore the parts room to order. Time One personnel handled the increased work load by extending shifts to twelve or fourteen hours and by adding a third shift to provide twenty-four hour service. More importantly, only limited repairs were made to keep equipment in the field, and certain jobs which, during normal times, were distributed among several members of the section, were telescoped and assigned to one man.

Highest priority during the emergency period was on meeting the demands of the immediate situation. Whatever had to be done to keep equipment working, no matter how unorthodox, was done. Thus, one member of the section described how some of the disaster contingencies were met.

If you had a piece of equipment -- a grader that had a major breakdown which was impossible to repair without parts -- we would rob the good parts off it to keep the other machines going. . . . We had four or five graders; we just switched parts back and forth, back and forth for a week. . . . We had to keep borrowing batteries here and there and switching everything around which you don't normally do. The water trucks were all out of batteries, so I had to go up and get out all the old equipment and get enough batteries just to get the four tankers up there to stand by for the fire department.

Ordinarily the extra parts would have been available from local suppliers or could have been borrowed from other organizations in the city, like The Alaska Railroad or the state department of highways. But the earthquake had disorganized and isolated these sources as it had the equipment maintenance section. It was reported:

Most of the local parts houses were damaged and we couldn't find the parts. You could get the parts

there, but they were having as bad a time as we were. Some of them were a lot more damaged than we were. We dug around in the parts room half of the time trying to find stuff -- patching up jack hammers that had broken down. . . . Normally you just order the parts or you have a spare, but at the time we handed those out we didn't have any spares to use. So what we did have we had to keep going. If it meant putting diesel fuel in a gasoline engine or gas in a diesel engine, we'd do it.

Additional equipment available during the emergency period, especially trucks donated by private contractors, made it possible for the equipment maintenance section to ignore major repairs which during normal times would have been given a high priority. There was generally enough working equipment left to replace any which needed extensive repair.

Anything major we didn't bother with, we didn't have time. If they had a major breakdown, they'd just park their truck and you'd go up to the equipment pool. There was always another one available.

To help facilitate street repairs and to make the best use of the time available (from five or six in the morning until dark when the damaged areas were sealed off by police and the Army) members of the equipment maintenance section did most of their work in the field. Refueling and minor repairs were done wherever the equipment was being worked. Generally one man was dispatched to do both. A maintenance man commented on this double duty:

A lot of that stuff needed monkey-wrenching as well as fuel and so rather than come back to the garage and get a mechanic and go out there, why, you could do that too.

Thus, major differences between the tasks of Time One and Time Two were that work was largely done in the field during the emergency period, an infrequent practice during normal times, and that the division of labor of normal times was often ignored during the days following the earthquake. Only on Friday night, immediately after the disaster, did men of the equipment maintenance section engage in totally different tasks, helping with the search-and-rescue operations and with the restoration of power and water to public buildings.

Their knowledge of welding equipment and emergency generators, and the fact that this equipment is stored in the city garage help to explain their participation. Beginning on Saturday morning, however, there was considerable continuity between the tasks of Time One and Time Two for the members of this section. They were not called upon again to perform wholly new tasks. Indeed, one of the maintenance men suggested that, overall, he was probably less busy during the emergency period than he would have been during normal

times. The reason, he argued, was that while there were more jobs to be done after the earthquake, they were not scheduled; thus, there was much time spent in simply standing by. "We were there if they needed us," he said, "but later on we returned to assigned day-work."

Treatment Plant Section

Members of two sections of the water division normally engage in maintenance tasks. The treatment plant section personnel are responsible for the operation of the plant itself (the electronic equipment is maintained and repaired by a representative of the company which provides it) and for the operation and maintenance of the seven deep wells which supplement the Ship Creek surface-water supply. Members of the maintenance section of the water division are charged with the maintenance of the distributive system, although they also perform certain small construction jobs from time to time.

Any interruption in water service is considered by members of the division to be an emergency. These interruptions, however, are also considered "normal," caused most frequently by power failures and breaks in the distributive system. A consequence of such "normal emergencies" is the virtually automatic response of experienced employees to these recurrent crises.

Thus, many of the personnel indicated that the tasks they performed following the earthquake were the "normal" activities which any emergency would provoke. This was especially true of the members of the treatment plant section, most of whom are experienced "old-timers." They were so familiar with the system -- the operation of the plant and the deep wells -- that the shift from Time One tasks to emergency operations was accomplished relatively easily. On duty at the time of the earthquake, one member of the section described his activities in terms of any emergency resulting from the loss of electric power.

I would say that a lot of the emergencies we have are closely associated with this one as far as what happened in the plant: the power going off and the valves closing. This could happen any time -- it could happen right now. And you'd see us take out of here and start going on manual and getting the light plant going for emergency power. What happened during the earthquake -- except for loss of the boilers and everything getting knocked out and the pipes broken -- it happens a lot of times when the power goes off. You've got to go through the same actions. . . . When the juice goes off, this plant closes down all the valves, and you've just got to open them and naturally get the chlorine in there as fast as you can. I would say that's the way it would be. If it happened tomorrow, it'd be the same thing.

Similarly, an operator responsible for the deep wells said that "all the men stepped into a normal thing: they knew what had to be done and they just went and done it." The basic difference between Time One and Time Two, he added, was that during the emergency there was much more work.

During the three-day emergency period (and for several days afterward), the plant foreman -- who lives at the site -- worked alternate twelve-hour shifts with his assistant. They worked alone in managing the plant and coordinating its flow of water with the repairs being made on the distributive system, but did receive a number of visits from persons outside their section. With one exception, however, these visitors did not directly assist treatment plant personnel but inspected the plant or performed tasks totally outside the work of the plant foreman and his men. Friday evening the manager and the general foreman of the water division spent time at the treatment plant. For two hours, together with the plant foreman, they worked to provide the plant with emergency power and restore radio communications with the downtown office. The principal motive for their visit, however, was to assess plant damage and determine its requirements for normal operations. On Saturday a representative from the company providing the plant's electronic equipment began the repair of the automatic system. This, clearly, was a task the plant foreman and his assistant were not prepared to perform themselves. Again, on Sunday, a maintenance crew was dispatched to the treatment plant to reinforce the roof, which had been weakened by the tremors and was in some danger of collapsing. The most important outside person at the plant was from the state (and Anchorage) health department, assigned to make emergency chlorine tests. Normal tests are taken by treatment plant personnel under the supervision of the health department, but during the emergency a higher chlorine content was ordered because of the danger of sewer contamination. Under these circumstances, the health department took over the tests directly. This was the only instance of clear change in normal tasks within the section. All other emergency operations of the plant were left entirely to the foreman and his assistant.

Because communication with other water division personnel, especially those engaged in emergency repairs to the distributive system, was vital if water services were to be efficiently restored, an additional member of the treatment plant section reported to work on Saturday to operate the radio. This extra man allowed the foreman and his assistant, who had also reported for work on Saturday, to continue the operation of the plant. Split shifts between the foreman and his assistant began at this time.

Other members of the section were similarly left to themselves in making emergency repairs. The man responsible for the maintenance of the deep wells, for example, worked alone during the two days following the earthquake. Of the seven pumps, four were undamaged and required only an adequate power supply to be returned to operation. The other three pumps, however, were damaged and not until Sunday noon were these wells back in service. During the emergency period, the power supply was erratic and, because most of the wells are manually controlled, this man had to restart the pumps whenever power was lost even for a short period of time. Thus, he was busy

moving from one to another of these wells throughout the emergency, despite the fact that by Sunday all seven of the wells were operative.

Water Maintenance Section

The maintenance crews of the water division were faced with a number of separate problems which, together, demanded a major effort at restoration of services. The earthquake had produced a great many breaks in the distributive system, in areas of land movement as well as in areas not so obviously affected by the disaster. In addition, the loss of power to the deep-well pumps precluded the immediate use of this source of supply for those portions of the system still intact. More breaks in the system resulted from the freezing of water left standing in the mains. Happily, the pipeline from Ship Creek to the treatment plant, although cracked by the earthquake, continued to supply water into the system; as soon as manual operation of the plant was possible, water in certain sections could be kept moving, preventing further breakage due to freezing.

The principal tasks of the maintenance crews, then, were to locate the existing breaks in the system, to close off those sections, and to allow the water into the undamaged parts of the system. Four hours after the earthquake -- despite the fact that the entire system had been drained -- water service was restored to much of the eastern portion of the city, residential areas least affected by the disaster. The valving operation continued throughout the emergency period, so that by Sunday, service was provided for almost all residential sections of Anchorage, except for those, like Turnagain, which had suffered the direct effects of violent ground dislocations. The surface water supply from Ship Creek had been interrupted on Saturday by landslides above the plant, but by that time power had been restored to four of the deep wells and they provided water to the operational parts of the system during the interruption.

To restore water service for the heavily damaged downtown and Turnagain areas, temporary installation of irrigation pipe was necessary. This work began, especially in downtown Anchorage (at the request of the mayor), on Monday at the end of the emergency period. The materials required for these temporary connections were ordered from Seattle on Monday; they began to arrive in Anchorage the following day. The actual construction therefore, did not begin until after the emergency period. The work of the immediate post-disaster period was to operate the undamaged system wherever possible not to repair the damages. One of the foremen described the tasks of the first week following the earthquake, "We couldn't do much repair the first week; we were just trying to get water where we could."

To this extent the tasks of the emergency period differed very little from those of normal times. Only infrequently are the maintenance crews called upon to make installations and connections in the system; rather their normal responsibilities are to continue the operation of the existing system. The emergency period, according to one of the maintenance foremen,

/was/ no different than a normal day except that it was longer hours; possibly we worked a lot harder, but we had more or less the same activities that we had prior to the earthquake, except that there were more valves to check, more areas to check out, more repairs. But outside of a little more speed, it was just routine.

The men on the crews, he continued, "Knew what they were doing, except they had a lot more to do." Because the effects of a break in the system were well known to the maintenance men and because such breaks were not uncommon, there was apparently little difficulty in meeting the demands of the disaster. "We've been through the same thing many, many times. . . . It was just bigger and lasted longer and everybody worked a lot harder /than before/." The same foreman summarized his own reactions to the situation by flatly suggesting, "I still don't think there was an emergency."

This reaction to the disaster was common among the "old-timers" of the water division. But for the manager and for other "new" members of the division, the effects of the earthquake were somewhat less easily dealt with. One maintenance worker, for example, compared his emergency tasks with those of more experienced members of the division and concluded that he had considerably more difficulty.

When our breaks showed up, we just had to run from one to the next. I never did any paper work; I was in the field all the time, running from one place to the next trying to find the valves and to help them shut it off or turn it on. It was pretty hectic there for myself being unfamiliar with quite a bit of the system. Some of the old parts of town, although you have maps and stuff, maybe they wouldn't show /the location of valves/. I mean there's some downtown areas /where it is/ just impossible without being there before to remember these things. And that's what made it a little bit harder for me than for /the others/.

The result was that he spent most of his time during the emergency period working with the "old-timers."

Similarly, the manager of the water division was in the field with the foremen of the maintenance crews during the post-disaster period. He was new to his position and to the Anchorage water system, and thus relied on the knowledge of the members of his crews to a greater extent than might otherwise have been the case. A respondent said:

He came into the office once in awhile just to see how the office crew was working, but other than that was in the field assisting the foremen in coordinating their work -- rather than them assisting /him/.

Highest priority in the water division during the emergency period was on maintaining public services, i.e., maintaining a supply of water to as many residents of Anchorage as possible. This task, just as the opening of fire lanes in the city, was dictated by the need for fire protection, water and sufficient water pressure in the event of double disaster. The emphasis of immediate emergency tasks was, then, on restoring service to the great relatively undamaged sections of Anchorage and, only after this had been largely accomplished, turning attention to the more severely damaged parts of the city which required reconstruction as well as restoration. In every maintenance section of the public works -- in the street and sewer crews as well as the treatment plant and water crews -- the highest emergency priority was placed on maintaining vital services: first, by reducing the potential for additional losses of public facilities and added dangers and discomforts to the public and, second, by restoring service to those parts of the street, sewer, and water systems which remained physically intact.

Unlike many members of the engineering sections whose normal tasks were necessary only when reconstruction began, and unlike certain personnel in the services sections whose Time One activities were almost totally irrelevant in Time Two, members of the maintenance sections found their tasks during the emergency period virtually unchanged from those of normal times. The maintenance priorities which had applied during Time One applied with even greater relevance to the disaster.

Services and Administration

The principal functions of the Anchorage Public Works are engineering and maintenance. The importance of these functions is reflected in the two major divisions of the department and the tasks of these divisions. But, in addition to these functions, there are certain public works "service" functions provided, on the one hand for the public and, on the other for the department itself. Of the first type, the sanitation section of the maintenance division is a clear example. Certain office jobs, like those of the clerk-typists and the administrative assistant, may be seen as examples of the second type of service. During Time Two, when maintenance became the principal function of the public works, this second type of service task was almost completely discontinued. This was particularly true of the customer service section of the water division and of office personnel like the administrative assistant and various clerks and typists of the organization. The suspended functions of the customer service section, for example, were record keeping and billing for the water division. Similarly, the administrative assistant and secretaries whose Time One tasks were discontinued performed services for the organization, not for the public.

Members of the sanitation section, however, normally perform the first type of service task. Their function is as vital to the safety of the public as the functions of the police and fire departments. During Time Two the function of this section was not suspended; rather, its activities were broadened, largely because of the disruptions in the city's sewer system.

Administrators, like the director and assistant director of public works, perform tasks which are defined by their authority positions in the department but, as was noted in chapter three, they tend to take either engineering or maintenance orientations in the exercise of their authority. During the emergency period their tasks remained administrative although their power of decision making was shared with a large number of other persons in the organization.

Some discussion and comparison of the emergency activities of members of the customer service and sanitation sections are presented here. The Time Two tasks of the administrative assistant and other office personnel are also described. But because the exercise of official authority is the principal task of administrators, a more detailed consideration of their activities is reserved for the discussion of authority and decision making in the next chapter.

Customer Service Section

Of the three sections of the water division, members of the customer service section assumed more added tasks than any other water employees. Members of the customer service section, unlike treatment plant and maintenance personnel, were called upon to perform totally different tasks during Time Two. One respondent said:

I'm thinking here of a customer service man who had only been working for us approximately two weeks when he suddenly found himself in charge of warehousing all the emergency gear that was being flown in, plus, I would guess, in charge of probably half a dozen laborers working under him.

We had our customer service people he continued out with five of the company's big boilers and they were thawing the service lines. That was another area of work that was covered by the customer service people rather than the maintenance people during the emergency period.

Employees in the section, according to another member of the water division, were almost completely unprepared for these new tasks. The man in charge of the warehouse, for example, "had never even seen a pipe fitting before and he had to keep a running inventory on everything." Similarly, the men in charge of the thawing machines had never seen a thawer before. The office clerk was on the radio during the emergency period and she, too, had had no previous experience to prepare her for this task.

The supervisor of customer services was himself new to the water division. He found during the emergency period that he, like those under him, was called upon to engage in activities which were completely outside the range of his normal tasks. He received, as one respondent put it, "three years' experience in three days" -- a statement which nicely captures the

radical change in his tasks. Normally his is an office position, but during the emergency he was variously occupied at the water system filtration plant and in emergency radio communications at the City Hall. "You just did what you saw to do," summarizes the variety of his activities as well as of other members of his section.

Sanitation Section

Members of the customer service section performed emergency tasks which were totally different from their normal activities, while the tasks of members of the sanitation section were broadened to include new but related responsibilities. Following the earthquake, the normal activities of the sanitation section were neither required nor possible in the disaster situation, but by Monday trash pickup as well as regular collection of waste from areas of the city without sewage service was begun. Thus, during much of the emergency period itself, the personnel of the sanitation section were engaged in tasks which were of more immediate concern: Friday night for example, the head of the section, the sanitation officer, and at least one of the drivers (plus certain individuals from outside public works) aided in restoring essential power services to a local hospital. On Saturday, members of the sanitation section helped the general maintenance section prepare water trucks should the fire department have need of them. On the same day three members of the sanitation section reported that they worked with other general maintenance crews inspecting the sewer system for earthquake damage. And the head of the sanitation section spent much of Sunday acting as public works dispatcher, relieving the general maintenance sewer foreman of the task while the latter coordinated the inspection and restoration of sewer service.

Inspection of the sewer system revealed the necessity of providing emergency sanitary service to hard-hit residential areas like Turnagain. To this end, on Saturday afternoon the head of the sanitation section organized the effort to free the city garbage trucks from the storage shed which had collapsed on them during the earthquake. At the same time, oil drums, similar containers, and chemical toilets were gathered. By the end of the emergency period on Monday, collection of human waste had been initiated by sanitation personnel, in addition to the resumption of their regular collection of the now great accumulation of emergency trash and debris.

The end of the emergency, then, coincided with an expanded but relatively regular work load for members of the sanitation section, a development which had also characterized the operations of the equipment maintenance section. For both sections, the emergency period had been marked by a "hurry-up-and-wait" pattern of tasks. One member of the sanitation section said:

There was a lot of time through those first couple of days that you would just be here at the shop on standby. I mean you weren't working continuously. You may spend an hour or two hours at a location of standby. . . . There'd probably be four, five or six men waiting for a job. As /the section head/ received a call for a job, he'd have these men at his disposal.

One characteristic which can be used to set off both the customer service section of the water division and the sanitation section from the other engineering or maintenance units of the public works is the regular schedule under which these service personnel normally work. Particularly in the sanitation section, this schedule of tasks, once described, remains relatively constant from one time to another. Representatives of the customer service section likewise operate by schedule. The emergency period radically disrupted the schedules of both sections. Members of the sanitation section had rescheduled their somewhat expanded tasks by the end of the emergency period; however, because the normal activities of customer service representatives were impossible until the water system was completely restored, it was sometime later before a similar regularity could be reestablished in that section. In the interim, the personnel were employed in tasks which often were completely new to them. The unstructured interim was considerably shorter for members of the sanitation section but they, too, were involved in new tasks: the head of the section for example, helped the health department with the testing of city water; one of the men in the section supervised a temporary warehouse for sanitation supplies at the airport; and several employees found themselves operating heavy equipment, like boilers, for which they had no experience.

Office Services

For public works personnel who normally do office work, like the administrative assistant and the several secretaries and clerk-typists of the organization, the disaster altered their tasks completely. Normal tasks were suspended altogether and office personnel filled in wherever they were needed. The emergency period, according to one respondent,

was entirely different. I mean, it was all just emergency work, trying to get the town settled, the emergency taken care of. Anything that could be let go -- I mean, routine work -- we just didn't do. We just did what we had to do and later did the other.

A secretary summarized her impressions of the emergency in the same way: "As far as routine office work was concerned," she said, "we just forgot all about that; we just helped wherever we could."

Office help could do little during the immediate hours after the earthquake. Neither the administrative assistant nor the secretary of the director of public works reported to work until Sunday. At that time the administrative assistant took over the hiring of additional personnel; the secretary worked in the city assessor's office with other clerical help who were tabulating the cost of the earthquake to public and private structures. For both, these were tasks completely outside their normal responsibilities.

The administrative assistant, however, was not entirely unprepared for his new tasks. He knew something of the paper work associated with hiring persons and during Time Two hiring was greatly simplified. It was reported

We didn't try to get any physical exam or finger print or anything. The application was completed and that was it. The new men weren't really on the payroll, they were paid separate checks. Those people who just worked one or two days or half a day, we just sent the time over to the payroll clerk and he'd write checks for them. It was more or less like we were buying some products -- it wasn't a normal payroll deal.

Only several days after the emergency period, when demand for additional personnel had declined somewhat and specific requests could be made (e.g., "We need six laborers and two truck drivers"), were normal procedures for hiring re-established. Even then there were problems.

Some of the men, I think, went to work and never did get paid. Maybe they didn't intend to get paid. Some of them never did turn in any time sheet. They were told when we hired them, "Be sure to make up the date and how many hours you worked that day." And if they didn't do it, they came and asked for their checks, we'd find out they didn't fill out a time sheet, we'd just have to make it out then and then pay them. Some of them just never came back.

The biggest problem, one respondent concluded, "was just keeping track of them."

However, one problem associated often with hiring extra personnel, particularly during the summer, was avoided after the earthquake. That was the problem of "drifters." According to the public works administrators, the majority of persons who were added to the payroll during the emergency period -- despite the unorthodox manner of hiring -- were local and very dependable. The greatest number of summer workers (somewhat less dependable apparently) had not arrived at the time of the disaster. An administrator said:

We were taking most everyone, anyone we could get . . . but we didn't screen them very well. Normally, I find it best to screen a person well before you hire him, but during the quake we didn't have time and the men were local so there wasn't too much to be frightened of because there wasn't this influx of drifters. It was still winter time; spring hadn't broken and the construction shift wasn't here, so we had local people to contend with and you don't have too much trouble with them.

Administration

Unlike other administrative personnel, the administrative assistant remained at the department offices throughout the emergency period. Both the director and the public works superintendent spent considerable time in the field with the inspection and maintenance crews. Their assistants -- the assistant director and the assistant superintendent -- served in the field and as communications and procurement officers at the Public Safety Building.

During the emergency period, the director and the superintendent of public works made frequent inspection tours of the most heavily damaged areas of the city. Saturday morning, for example, the two of them made a first-hand inspection of the 4th Street slide. The superintendent also supervised the gravel-haul operations. The director was "in and out" of the Public Safety Building throughout the weekend making personal inspections of damaged areas and emergency repairs. The superintendent continued at the Public Safety Building -- which had by then emerged as "disaster headquarters"; his assistant operated from the public works shop where the maintenance crews were assembled and dispatched.

The procurement of supplies fell to the assistant director, a task which involved considerable radio communications. He emerged as a liaison between public works, civil defense, and the military, because these two latter organizations obtained much of the public works' emergency supplies. A more detailed description of the relations among these organizations will be presented in chapter five of this monograph.

Conclusions

Although Anchorage had never suffered a disaster of the scope of the March 27 earthquake, and although public works had no disaster plan, those sections of the organization which were normally responsible for the maintenance of public systems -- streets, sewers, and water -- were generally well-prepared to meet the emergency. Personnel of these sections had considerable experience in meeting smaller, less diffuse crises: a break in the water or sewer system, a power failure and loss of service to the treatment plant, and the like. For these personnel, the earthquake produced a situation which differed in degree rather than kind from what has been called "normal times." A public works official probably had this idea in mind when he observed that, "sewers are sewers whether they are broken because they are stopped up from /earthquake/ debris -- they are still sewers and they have to be unstopped." And almost every member of these maintenance sections, during their interviews, somewhere observed essentially the same continuity: "We knew what had to be done, and we did it." Task priorities, then, for maintenance personnel remained constant. Consequently, tasks they engaged in during the emergency period were essentially the same as their normal tasks.

As will be suggested in the following chapter, the most important change in Time Two behavior for maintenance personnel was generated by the scope of the emergency. The earthquake resulted in damage so widespread that too few

persons were employed in the maintenance sections to cope adequately with it. But additional personnel required changes in the authority structure of the organization, and, at the same time, the imperative for quick restoration of essential services required change in patterns of decision making. In this respect the earthquake may be said to have been an emergency for maintenance personnel: it demanded the performance of a great number of familiar tasks in a situation which also demanded increased speed.

For engineering personnel, the earthquake was a "disaster." Their normal tasks were irrelevant to the changed environment, so irrelevant that for many there was nothing to do. For others new tasks were assumed: "We saw what had to be done, and we did it." The end of the emergency -- better, the end of the disaster -- for these persons was marked by their return to their normal tasks or, for some, simply by their return to work.

If the maintenance personnel found that an extension in authority was necessary to coordinate the operations of a greatly expanded work force, personnel in engineering quickly discovered that their authority problems were more difficult, even though they had not added any new persons. In taking on new responsibilities, the engineers had so altered their normal behavior that, for example, their authority relationships were reversed. Thus, chapter five will be devoted to a discussion of changes in authority and decision making in the engineering and in the maintenance sections of the public works.

Those engineering personnel who were most actively involved in the tasks of the emergency period were supervisors. Probably their emergency activities were largely consequences of their being supervisors: even though their normal tasks were irrelevant, as supervisors they felt that they should involve themselves. Similarly, public works administrators were active during the disaster period, less in the sense of doing things as in the sense of organizing those who were. From this point of view, their tasks did not vary from Time One to Time Two. This is consistent with the frequent observation that persons occupying the higher positions in an organization find it difficult to give specific descriptions of their tasks. Their tasks, in effect, are whatever they do. Chapter five includes a discussion of the authority tasks of public works administrators -- a description of what they did, their authority and decisions during the emergency.

FOOTNOTES: Chapter IV

1. For a discussion of the conditions which generate search and rescue activities, see Russell R. Dynes, Organized Behavior in Disaster: Analysis and Conceptualization, Disaster Research Center Monograph Series (Columbus: Disaster Research Center, The Ohio State University, 1969).
2. The local civil defense director had resigned his position several weeks before the earthquake. Thus, there was no formal, local official of that organization available to coordinate the immediate post-impact activities. On his own initiative the resigned director began to work soon after the earthquake and was informally rehired in the middle of the night.
3. J. A. Fife and C. E. Cannon, "How Anchorage, Alaska Restored its Water and Sewerage System after the Earthquake of 1964," Water and Sewage Works (April 1965): 122.

CHAPTER V

TIME TWO: AUTHORITY, DECISION MAKING, AND COMMUNICATION

In this chapter, as in chapter four, the engineering-maintenance-service categories are employed. Thus, less attention is paid to the official structure of the public works (described in chapter three) than to the similarities and differences among the three functional elements of the department. In most cases, however, references to public works personnel are made in terms of their specific division and section. In the context of this chapter's discussion of authority and decision-making patterns during the emergency, communications during Time Two are described. The substance of this chapter, then, may be seen as the completion of the discussion of emergency priorities and tasks in chapter four. Implicit in this discussion is a comparison of Time Two patterns (figure 3) with normal times.

Engineering

There were other people that I saw too that just happened to be in the right spot at the right time when somebody had an idea that something ought to be looked at. Then we went and did whatever needed to be done at the time. . . . You didn't necessarily worry about the authority or anything like that. The chain of command was avoided for awhile.

Members of the engineering sections of the public works consistently described authority patterns during Time Two in terms of their discontinuity with Time One. This statement from one of the members of the design section of the division of engineering, then, is typical. In the absence of normal task priorities but with strong motivations to help in the emergency, public works engineers took on a wide variety of new tasks -- tasks which were outside their normal responsibilities and, thus, outside their Time One patterns of authority. Indeed, for many engineering personnel, given their emergency activities, normal lines of authority were completely irrelevant. As was suggested in chapter four, this situation was clearer in some sections than in others. In this discussion these differences are made explicit.

Survey and Design Sections

The heads of the survey and design sections of the engineering division were most clearly out of their fields. The heads of both sections independently took on the inspection of the sewer systems. The head of the survey section indicated that this decision was completely his own; indeed, for the first several hours he made his inspections entirely alone. Similarly, of the emergency tasks of other sections, it was said:

By and large during the first days of the emergency, decisions were just made by the people who saw

the problem. The section heads here . . . certainly had wide latitude in making decisions. Frankly, I don't know if we had to get anybody's concurrence on these emergency decisions.

When they did check with other members of the public works, these conferences were chance meetings during the emergency and not conscious attempts to locate persons who had authority. Thus, the heads of both the survey and design sections spoke individually with the head of the construction section about inspection and restoration of the sewer system. This independence, as both men pointed out, resulted in considerable duplication of efforts and obvious lack of coordination. "There was a lot of duplication with other agencies," one of the engineers said, "and a lot of backing up and starting all over again." The other engineer made the same observation, "There was a definite overall lack of coordination in my opinion, and I thought that there was a tremendous waste of talent."

Coordination among all the engineering sections was the greatest problem during the first days of the disaster but, behind that problem lay a more basic one: simply that there existed no definition of appropriate emergency tasks for engineering personnel. It is difficult to coordinate the work of persons who are uncertain of what they are to do.

Nonsupervisory personnel of the survey and design sections appeared more likely to check with some superior, although they frequently indicated that the supervisor was not their own. Thus, one of the members of the survey section returned home Friday night after he was told by the head of the design section that there was little he could do. He reported back to work only on Sunday afternoon after being called in by his own supervisor. An engineer in the design section took his orders from the assistant director of public works and worked Saturday with the head of the survey section. "There was no special duty that I had to do," an engineer in the survey section said,

but I felt that I should call in here or stop in here and find out if something had to be done. I should get a hold of my immediate supervisor -- or somebody, the next one higher.

Most engineers reported they made more decisions during the emergency than they would have during normal times, but they also reported they received orders from more persons than would normally have been the case. Supervisors of other sections, because new tasks broke down Time One authority distinctions, often suggested tasks for these men. Only one member of the engineering sections indicated that he made fewer decisions during the emergency; but he, too, received instructions from many more persons than he would have in Time One. He was in the design section and was in charge of providing utility maps for inspection teams. By Sunday, when the sewer inspection had begun to be organized, it was clear that the distribution of these maps would have to be more strictly controlled: "I couldn't give these maps to just anybody," he said, "I had to check with my boss or with the city manager over

in City Hall." The loss of irreplaceable maps during the first day and a half of the emergency demanded this checking to insure the return of other drawings and maps. Personnel of the survey section learned a similar lesson.¹

As these incidents suggest, coordination within engineering sections was achieved with less difficulty than coordination between them. In the survey section particularly, a radio link between the head of the section -- who was operating in the field -- and his assistant and members of his staff in the office was established on Sunday. This communication facilitated sewer inspection; the supervisor was able to call back to his office for information available only from maps and drawings on file there. A member of the survey section described the establishment of this radio link and his contribution to the field work this way:

When I came in on Sunday afternoon, I called /the head of the section/ on the radio and he asked that I come out in the field then, which I did. We talked about things and he said that he was going to be out in the field a good deal and that I should come into the office and try to keep things coordinated and just do whatever I thought was necessary. . . . I spent about ninety-five per cent of my time digging through the files coming up with information out of the field books and off the maps and relating this to the various field crews.

That the section head and his assistant were good personal friends probably added to the efficiency of this operation. On the other hand, some of the difficulty in establishing coordination between the survey and design sections probably derived from Time One antagonisms between certain officials in these two sections.

In contrast to the office-bound personnel of the survey section, members of the design section worked in the field. All interviewed members of the section reported that they worked on various inspection crews during the emergency. "Our section wasn't functioning as a whole," one member said, "we were scattered all over." He, for example, was working with the survey section head; another member of the design section was working with the head of the construction section; and the supervisor of the design section was engaged in sewer inspections. Nor did all of the members of the section have access to radios. Thus, communication and coordination within the section would have been difficult had it been required. A radio link between the head of the section and one staff member working in the office was established by Monday. As was generally true of all the sections of public works, the survey and design section personnel relied on radio or face-to-face contact.

Traffic Engineering Division

Traffic engineering had little to do with the immediate emergency tasks. "With the exception of liaison work," a member of that division said, "this office was not an instrumental part in the restoration activities." Until

Thursday of the week following the earthquake, the division head served with the National Guard and, during that time, took advantage of his dual position in the city and the military to act as liaison for both the public works and police department (with which his division normally has considerable contact), and with the National Guard and other military organizations involved in the emergency. This, it was said, was his division's principal contribution to disaster operations. He also served as coordinator for these organizations and the state department of highways and the municipal light and power department.

During the three-day emergency period, the traffic engineer exercised little authority over the members of his division; only his assistant who began assessing damages sustained by the traffic-signal system of the city reported regularly to the division head. Other members of his division were co-opted by other sections of the public works. Describing this situation one member of the division distinguished between what he called the operational units of the department -- the maintenance and water crews -- and the design and planning people, in other words, the engineering personnel like himself.

Your operational groups /he said/ were in high gear, and your other folks, such as your design people and your planning people and so forth, were not directly involved. They did assist other agencies and operations. For example, we had a parking meter repairman dispatching heavy equipment because nobody needed the parking meters repaired during this period.

Other members of the division were not required at all, as a public works administrator noted in the following summary statement:

The traffic engineering division here was dead. There was nothing really they could do. They don't actually have barricades; they don't actually have the traffic signals because they belong to the municipal light and power /department/. So what could the traffic division do? They could do whatever they could find to help others and whatever they were capable of doing.

The tasks of the traffic engineer himself reflected the irrelevance of his division to the emergency. He functioned less as the traffic engineer than as an extension of the administration, as liaison between the assistant director of public works and administrative personnel of other city and military organizations. Certain public works divisions and sections, however, were highly relevant to the emergency and these units, a member of the division suggested, operated almost autonomously. These observations were made in the following statement, illustrating a point to which the final chapter of this report will return.

It's a practical matter that the public works department is too large to have everything funnel through one headquarters. I think that probably maintenance pretty well operated as a separate entity. As did water. As did the men working on sewers. And so did the building inspection division. And other agencies. I think that's the only way that it can operate -- similar to a military operation. You have a headquarters and you pretty much keep the commander advised as to what you're doing, not requesting advice on what to do. This, I think, is normal in an emergency. It is to be expected.

Construction Section

Certain engineers in the construction section, the building construction and maintenance section, and the building inspection division were considerably more active in the emergency than the traffic engineer. The head of the construction section, as described in chapter four, assumed major responsibility for the establishment and coordination of the equipment pool and, in addition, was important in organizing the inspection and repair of the sewer systems.

In terms of the participation of engineering personnel in the immediate tasks of the emergency period -- in the inspection of the sewer system particularly and the coordination of public and private equipment and crews -- the head of the construction section emerged as the nominal, if not the official, leader. A number of factors contributed to this development. First, he was considered by many to be a very able and knowledgeable organizer. The head of another engineering section described the construction head as a man who "commands a great deal of respect and gets things done; people are always ready to go along with his ideas." And another engineer described, with approval, the construction head's procedures during an emergency.

He is the type of person who feels that something has got to be done in an emergency and that there is no sense in going through channels and this and that, so let's do it and get it done with. In a time like that you can't be bothered with red tape. . . . Anyone who has a knowledge of engineering and knows a little bit about these things can get things done. He's got the background as to what has to be done, so why go to the big people.

Again, his neutral position regarding the somewhat strained relationship between the survey and the design section heads, made him a more acceptable leader than either the survey or the design section supervisor would have been.

Secondly, the construction head's responsibilities during Time One provided valuable experience and extraorganizational resources on which he could draw during Time Two. Of the engineering personnel, he maintained the closest and most consistent relationships with private contractors. He was, of all the engineering staff, most concerned with field activities, i.e., with the actual construction and installation of city facilities; and he was familiar with the type and extent of heavy construction equipment available in Anchorage. Thus, both his official Time One tasks and his unofficial reputation contributed to his emergence as a leader of these emergency activities.

The construction head's special capacity for coordinating the activities of inspection crews and later, equipment and personnel contributed by private contractors were complemented by the specific knowledge of engineers in the survey and design sections. The head of the design section, for example, knew the location of many of the sewer installations since he had, in fact, designed many of them.² According to one respondent, the design head

was of immense importance in the restoration of services in that he had detailed knowledge of many of the facilities and a good knowledge of the systems -- both water and sewers, and the storm drains. This was a valuable service to the maintenance personnel in their attempts to relocate lost sewers and so forth.

Likewise, the head of the survey section went on sewer inspections because they involved more than a mere description of the damage. The emergency repairs were only temporary and, in many cases, were above ground: thus, his knowledge of what was called "field design propositions" was an important contribution to the restoration efforts. These two men, however, yielded to the construction head in organizing the equipment and crews in the total effort. That he had more experience than the assistant director of public works -- who is also the head of the engineering division -- was suggested by several engineers as part of the explanation of the construction head's emergency leadership.

The organization of the equipment pool was the construction head's own idea. When he suggested it to the director and assistant director of public works, their approval added official authority to a position he had already assumed. The equipment pool itself was functioning Saturday and, with assistance from members of the maintenance division who took over dispatching the equipment, the construction head added much to the successful emergency street repairs during the two days following the earthquake. Indeed, not until street repairs were almost completed did members of the engineering and the maintenance divisions pay systematic attention to the damaged sewers. The first important steps in the coordination of these repairs were made on Sunday afternoon. And, "by Monday," an engineer recalled, "we had everybody organized and doing something useful."

Building Construction and Maintenance Section

If the construction head became a kind of general coordinator of the survey, design, and construction sections, the head of the building construction and maintenance section took on a similar function for his own section and for the building inspection division. And, like the construction head's group, the Disaster Control Office -- as the building construction and maintenance head's group came to be called -- included a large number of persons from outside the public works who volunteered their services. The Disaster Control Office (DCO), however, emerged as a distinctive group, separate from the public works, although its core was made up of members of that department. The construction head's group, on the other hand, remained within the context of the public works. One of the major considerations, which even during the emergency period served to reinforce that group's affiliation with the public works, was the inevitability that some of the private contractors whose equipment and crews were used would wish to be reimbursed. Given the activities of the Disaster Control Office, it was clear that outsiders who offered their services did so on a purely voluntary basis.

From the immediate post-disaster period, the Disaster Control Office was involved in a range of activities which it claimed by default. The absence of a viable civil defense organization was the most often cited rationale for this claim. (As noted in chapter four the position of local civil defense director was vacant at the time of the disaster, a fact that seemed to be widely known by most Anchorage municipal officials.) A member of the Disaster Control Office, however, suggested there were others who were not prepared to assume all their disaster responsibilities and, in that case, the DCO was. He described the genesis of the group in the following statement:

There seemed to be no command, no authority, no one taking hold. So /we/ did this. /We/ took command. The chief of police and the city attorney were there. . . . The city attorney was in full possession of his faculties and had control of himself and between the two of us we got organized with this traffic control business and began to send out rescue teams and the damage assessment teams. This is important because the functioning leadership was not in the hands of those who had the /official/ leadership positions.

Although the head of the building construction and maintenance section could see some continuity between his normal tasks and those he undertook during the disaster (i.e., at both times his principal concern was with public structures and public safety), he was aware that the specific tasks which his group performed under his direction during Time Two took him well outside his normal authority. "I'm afraid," a member of his group said, "that in many cases we overstepped the bounds of our authority." This respondent added, however, that this did not matter: "We did what we felt needed doing and where it needed doing."

The presence of the city attorney and the chief of police sanctioned the first actions of the Disaster Control Office. The first of the rescue-and-assessment-team members were deputized and given identification symbols by the police chief. Both he and the city attorney declared that securing lives and property was more important than strict adherence to legal norms. But after the first hour these officially sanctioned procedures were dropped. No additional authorization was given to the new group, although the city manager and the director of public works gave their approval rather indirectly during the emergency period. A member of the building construction and maintenance section recalled that the city manager, "sort of put his ear to the ground around our operations a few times and said, 'Okay, carry on,' and went on his way." And the section head had occasion to check with the city manager when a complaint about his crews removing hazardous debris from a damaged building was received. According to a DCO respondent the city manager said, "Forget it. Just go ahead and do it. Do what you have to do." And they did. As this same respondent put it, "Any problem that we were made aware of, we took a shot at it if we could." Only later in the emergency period did the director and assistant director of public works become involved in the Disaster Control Office; all day Saturday, a member of the group recalled, "we were entirely cut off from higher level divisions," i.e., from the public works administration.

The events which brought the director and assistant director into the new group's activities illustrate the prerogatives DCO exercised during its brief existence. As described in chapter two, a number of large buildings were so severely damaged by the earthquake they could not be repaired. Penney's department store in the downtown area was such a building; it was a six-story structure which ultimately was torn down. During the emergency period, however, there appeared to be some chance that portions of the damaged building might, in fact, collapse were there subsequent tremors and some DCO members considered the possibility of removing this hazard by destroying the building with explosives. Apparently there was talk of removing other hazards by the same means. Dynamite and caps had been collected and an announcement of the possible use of explosives had been released by the radio stations. The director of public works, as well as the city manager, learned of the project about this time and declared that such demolition would not be carried out. A Time One member of the construction section who served with DCO during the emergency described that decision.

I was with the city manager and the director of public works when they /DCO/ said that they were going to shoot the Penney building down. But there was nobody who knew whether there were people still alive in the building. So the city manager and the director of public works definitely said that we would do nothing with that building.³

Another DCO respondent indicated that, "this was the only time /we were/ told something from above"; he added, however, that by the time they received the orders from the director, they had decided not to use dynamite.⁴

Other (less explosive) events also demonstrated that DCO's claim to emergency authority was not always recognized by the public. Owners of damaged buildings objected to DCO crews entering and altering their property: according to a respondent, they "came on like a herd of mad sheep." In these instances, however, the inclusion of a policeman and soldiers on DCO crews provided official sanctioning sufficient for the work to continue.

On the other hand, the Disaster Control Office became so well-known among emergency workers that apocryphal stories circulated about their activities and their reputation. One such story, which bears on the recognition of their authority, was related in the following:

Some things about the Disaster Control Office . . . became rather a joke. Most people were working twenty-four hours around the clock on the evacuations of different buildings. Anybody who wanted to get into any roped-off area just had to say that he was part of the Disaster Control Office. He got through.⁵

Another respondent, however, declared that getting into areas which had been cordoned off was not quite as simple as that. The problem was the Eskimo guards whose command of English was less than complete making communication difficult.

Nobody could talk their way past one of their checkpoints. If you had all the passes that we were issuing, you still had to talk like a Dutch uncle to those boys to get through.

Members of the rescue and security teams of the Disaster Control Office also experienced some problems with identification -- as did other members of the public works. Not all city employees had been issued identification cards and there were no standard insignia -- either hats or emblems -- which would set public works employees apart from curious sightseers. As a result, guards had to be convinced by maintenance-and-rescue teams that they were bona fide public works personnel. Issuing improvised passes during the emergency did little to clarify this situation; the Disaster Control Office made "police" armbands out of sheets very early in the emergency and gave them only to volunteers directly involved in the disaster work, but very shortly so many people were working that armbands were distributed wholesale. Some members of DCO security crews carried a letter from the building construction and maintenance head identifying them as official city workers; an inspector from the construction section working with the DCO said that he carried one.⁶ Other passes were issued by a member of the building inspection division (also associated with the Disaster Control Office).

The people that wanted passes were groups that came in here . . . that wanted to look at the emergency. They couldn't get in on account of the

blockade, so I called up the police department and the Army and asked them about getting these people in. They said, "issue them a pass." So I dreamed up a little pass, had the secretary type up a whole mess of them, and started passing them out to people I thought should go into these areas -- and the thing worked. There were hundreds of people who came through here.

The problem of passes was not resolved during the emergency period. In his after-action recommendations, one engineering supervisor made a number of suggestions -- ID cards, easily recognized hats -- to avoid identification problems in future emergencies.

The core members of the Disaster Control Office were Time One employees in the building construction and maintenance section. They were augmented, first, by a number of the section head's friends who assisted him in the coordination of the group's activities; second by rescue teams from the community and the military; and third by volunteers from the community. But the Disaster Control Office also absorbed members of the building inspection division of the public works, as well as certain members of other engineering sections of the department. Normally, the head of the building inspection division occupies an authority position roughly similar to the head of the building construction and maintenance section.⁷ During Time Two, however, both he and his personnel became part of the Disaster Control Office, under the direction of the building construction and maintenance head -- just as volunteer architects and engineers from the community became members of the new group.

Although others involved in rescue-and-security activities corroborated DCO leadership by the head of the building construction and maintenance section, members of the building inspection division did not mention the Disaster Control Office at all, but referred instead to their division. This division, one member said, "was sort of the center of activity . . . of the emergency: the building inspection division suddenly sprang into prominence." It seems clear, however, that the Disaster Control Office -- which included personnel of the building inspection division -- "sprang into prominence" during the emergency.

This conclusion is reinforced by evaluations by other engineering personnel who either worked with the building construction and maintenance head or were aware of his activities. For example, these comments were made about the DCO coordinator.

He did a magnificent job . . . in an area somewhat outside his line of work. He was tireless and did an outstanding job. I don't think there's any one man who stood quite so tall during the emergency as he did.

The head of the building construction and maintenance section was singled out by a public works administrator as the man in charge of all "search and immediate relief"; in this capacity he was asked to attend all staff meetings during the emergency. And this same administrator seemed to have had the Disaster Control Office in mind when he suggested the necessity of change in the operations and authority structure of the engineering division during Time Two.

The operation under emergency conditions changed. You have different types of organizations put together. They're born there. You have to make the organization fit the situation.⁸

The internal organization of the Disaster Control Office also suggests that the head of the building construction and maintenance section was in charge. It was said, for example, that he made all the major decisions because his new group was seldom contacted by the administration, either public works or city government: "I don't know for sure where they /the director of public works and the city manager/ were or what they were doing." In any case, he was willing to take on this new responsibility -- as were other core members of the group. Indeed, one of them explained the success of the DCO solely in terms of their willingness to take on these new responsibilities and their knowledge of community resources.

One of the reasons this organization was so successful was because we were fortunate to get people together not only who were willing to assume the responsibility and authority, but who knew where to go to get what. Now, we had /the building construction and maintenance head/ who worked with the municipal crews. He knew the whole city set-up. We had /another man/ who is closely associated with a large number of merchants around town and contractors, and then, we had myself . . . I am very closely associated with all the construction contractors and union men around town. So this was how we were able to put these guys together because we personally knew these people.

In addition to personal friends of the section head, the new group also included the members of his public works section. "Each one of /his/ men," a DCO member said, "became a foreman or a leader of a team of some kind." Thus, the foreman of the section was the leader of one of the security crews during the emergency period, and the section's plumbing-and-heating repairman organized fourteen volunteers to check the heating plants of Anchorage public buildings. As emergency leaders, each of the members of the section made many more independent decisions than they would have during normal times -- as one section member said,

I more or less took it on myself. I mean, because /my supervisor/ wasn't available . . . he had, you know, so much to do, it would have been just a nuisance to contact him. He's told me that any decision I make, he'll stand behind it, and he trusts my judgment, so I go ahead.

The members of the section did check with each other: the plumbing-and-heat-ing repairman talked with the section foreman, but consulted the section head only on major repairs.

The emergence and brief existence of the Disaster Control Office during the emergency period (it was phased out of operation by Wednesday of the following week) was the most dramatic example of authority and decision-making change in the public works. Its existence derived from a number of separate factors: the absence of a formal civil defense director in Anchorage; the peculiar dual functions of the building construction and maintenance section -- both engineering and maintenance; the personal characteristics of the heads of that section and the division of building inspection; and, the new priorities and tasks which the DCO head and his group were willing to take on during the emergency. The basic motivation, according to one respondent, for these new tasks and emergency authority was "moral compunction": "Here is something that needed to be done; it had to be done; so, okay, let's get it done. We didn't care if it was legally right."

Maintenance

The contrast between the emergency authority assumed by certain of the engineering personnel and the Time Two patterns of the maintenance sections -- like the differences between the emergency tasks of these two elements of the public works -- is one of the major themes of this monograph. In this discussion the authority and decision-making patterns of maintenance personnel are described and the differences between them and the altered patterns of the engineering divisions of public works analyzed.

In the maintenance units -- particularly the general maintenance section (streets and sewers) and the equipment maintenance section -- the major changes in authority occurred within the existing, normal structure. There were, for example, a number of field promotions and one shift in emergency tasks, the latter being a move toward increased specialization in Time Two operations. Additional, but less dramatic, changes in authority were required by the influx of emergency personnel in the street, sewer, and water maintenance crews but, unlike changes in the engineering units, authority changes in maintenance sections did not cross official structural lines.

General Maintenance Section

Two separate changes took place in the general maintenance section. The first was the "field" promotion of four leadmen to crew foremen. These promotions were a direct result of increased numbers of maintenance men during the emergency period (and during the weeks following). From a total of

some thirty men, the general maintenance section grew to upwards of one hundred men; it was clear that three foremen and one general foreman were insufficient to coordinate and supervise the activities of so large a maintenance crew. The promotions were made, unofficially, during the days following the earthquake. Not until the following week, however, were these changes made official.

Three of the new foremen took their responsibilities and performed very adequately -- even before their promotions became official. "They just took it upon themselves," a division administrator said, "and made decisions which we appreciated very much because they really got the problem done. And they had so much more work accomplished." The fourth of the new foremen did not do well in that position. Again, the division administrator described the circumstances:

We tried another grader operator out as foreman but he lasted only half a day. The authority went to his head. He got on that radio and he just wouldn't quit. We had to take him off before noon. He's the best grader operator we have, but he just can't control himself with the radio, so we had to take him back. He's a little bitter -- he doesn't like it -- but it's just something that had to be done.

The decisions to promote the men and the subsequent decision to denote the one man were made by the superintendent and assistant superintendent of public works and the general foreman. Time One foremen approved of the promotions: "They the new foremen knew what had to be done and when they finished one job, they'd go ahead and move over to another one," said a Time One crew foreman. Similarly, there was consensus among the members of the crews: "They just had to have more leaders," a crew member said.

Associated with these formal changes in authority was a somewhat informal adjustment which took place within the crews. New personnel were added to the section in such numbers that, even with the creation of new foremen, efficient operations required additional supervision. This leadership was provided by the experienced members of the section: in some cases, men who held the position of leadmen; in others, men who (relative to new personnel) were "old-timers." These men acted as informal leaders in the crews, acquainting new personnel with procedures and serving as sources of information on city installations and equipment. One of the crew foremen indicated how he and other foremen divided up these experienced men.

We split up our old men, you might say. Your leadmen and other men who knew the town and stuff like that; these men took so many of the new men and I tried to keep so many of the old men and the other foremen tried to keep so many of them and that way if we had to put a crew out someplace, we had at least one old man that had some kind of knowledge of actually what you were trying to do.

Tentative steps had been taken the month before the earthquake to set up a separate sewer crew under one foreman whose principal task would be the maintenance of the city's entire sewer systems. During the emergency period this change in task allocation and authority was made more definite. On Sunday afternoon, with emergency street repairs nearly completed, members of the maintenance division turned to problems created by the disruption of the sanitary and storm sewer systems. The foreman nominally in charge of sewer maintenance was given full authority to supervise all operations in that area by the director of public works and the general foreman of the maintenance section. This was the second of the changes in authority in the general maintenance section. Of the results of this delegation of authority, a division supervisor said:

I think that it speeded things up an awful lot. Otherwise the sewer foreman would have had to be asking questions and it would have been more or less confusing going through two or three persons, coming down through the chain of command. And it just wasn't coming down the chain of command -- nothing was coming down. You just sort of went ahead and did the job. You had a job to do and just went ahead and did it.

At the time only three men in the general maintenance section were experienced in maintenance and repair of the sewer systems and, as already noted, the city maps and diagrams of the system were incomplete. Inspection and charting of damage began Friday night following the earthquake, but until Sunday afternoon little had been done to coordinate the various engineering teams engaged in these inspections. Thus, the sewer foreman required assistance from the engineering sections in locating the damage to the sewers and, once located, additional maintenance personnel to assist the experienced men in repairing the damage.

To satisfy the first requirement -- and to determine exactly what had thus far been done -- the sewer foreman called on the head of the construction section. The foreman had specific reason to ask for this engineer's assistance according to one respondent.

He felt that the construction head would be the better man because he had worked directly with the local contractors and he knew what equipment they had, what was available, and who was the best contractor for the individual job that they had to do. It worked real well.

The construction head's Time One associations with private constructors, supervision of the emergency equipment pool, and knowledge of the sewer inspection teams, made him the ideal man to assist the sewer foreman.

The second requirement, additional personnel, was satisfied by local construction crews recruited by the construction head. In these crews,

however, the experienced public works sewer men played a very important role, a role similar to that of the "old-timers" in the street crews. The dispositions of these men was described in the following:

We'd try not to work them over sixteen hours a day, but I know that some days these men had to go eighteen or nineteen hours because they were on a particular job where they were needed and not just anybody could come and take their job over and do it. Some of this is quite technical. At the time we had only three men who knew anything about the sewer lifts and the sewer department . . . so we couldn't bring just anyone in to relieve them. They had to be worked in slowly. We would send another man with /the experienced man/ and after a couple of days the new man would gradually take over and come in and relieve him for two or three or four hours.

That they "tried not to work them over sixteen hours a day" clearly suggests the premium placed on these specialized skills during the emergency period.

Ultimately, sewer repair was taken over by the U.S. Army Corps of Engineers, but until that organization began its operations, sewer repairs were made by the public works department. In addition to the construction head, other members of the department were consulted by the sewer foreman. Other engineers who had firsthand knowledge of the sewer system, including engineers who were no longer employed by the public works, volunteered or were called in for assistance. One of the foremen in the water division, familiar with the location of both water mains and sewer systems, was also consulted. His assistance was also very valuable.

Finding the location of some sewer lines in a particular area was hard . . . /we'd/ talked to /the water maintenance foreman/ before about things like that and he had told /us/ where the line was and approximately how far /we'd/ have to go to pick it up and get the right location. /He knew this/ because he'd been in the area before and he'd installed maybe a water-service connection. There were a lot of lines broken and that's why /we/ consulted with him.

Similarly, advice was sought of the sanitation foreman, a man who had considerable general experience in the public works. Outside the public works, the sewer foreman checked with one of the foremen in the municipal light and power department. Because the sewer-lift stations are powered electrically, some coordination with that department was required in attempting to restore service. "Everyone was very cooperative at that time," a sewer worker said in summary, "/We/ didn't get any static at all."

Early in the disaster period street repairs were coordinated by the general foreman and the crew foreman. With one foreman at the gravel pit supervising the dynamiting of the frozen gravel and the loading of the trucks and other foremen located at the faults under repair, the operation was carried out with considerable dispatch and efficiency. During this time, the sewer foreman served as radio communicator and the construction head coordinated equipment and personnel volunteered by local construction companies. "It worked out very well," a supervisor indicated,

in two days -- Saturday and Sunday -- we hauled in the downtown area, opening up firelanes through the faults, approximately sixteen thousand yards of gravel.

The success of this project is revealed in the observation of one of the maintenance men that by Monday the section was sufficiently organized to allow the posting of written daily work assignments, a practice which had been suspended during the emergency period. Even on Saturday and Sunday, however, operations were clear enough that a man reporting for work could take his place in the gravel haul without requiring specific instructions from any of the foremen or leadmen.

As far as the gravel haul, one of the maintenance men said/ when I got in here, well, it seemed to have been the big deal going on so that's what I did. That was most important at the time, so I pitched in and started on that.

All that was required, he added, was to follow the truck in front of you.

In this operation, just as in the sewer repairs, the experienced men were vital to success: as one foreman put it, "These are the guys that really helped because they knew their way around." "Old-timers" served as extensions of the foremen, passing on directions and making decisions which foremen would ordinarily have made. One man, for example, directed the trucks through the damaged section of Anchorage, indicating to the drivers where they were to dump gravel.

The foreman would come along and would say, "We are starting a new hole at so-and-so. Fill it. Send eight or nine or whatever figure of trucks there for a while." As they got one filled, they would come and tell me to cut the trucks off and send them somewhere else. . . . About the only decision I would make would be rather than have the trucks pile up I would send them on down to another hole where I knew they were working. The foremen did decide -- they told me at the start -- that they would go right down the line and take them in order. If they made any changes, they would tell me and I would in turn tell the truck drivers.

The foremen, however, made all the major decisions. Operational decisions were largely made by crew foremen and the general foreman. The section's link with the administration, particularly with the director of public works, was maintained by the superintendent of public works who spent most of the first hours with the director at the Public Safety Building. On Saturday he joined his crews at the shop but maintained radio contact with the director.

The general maintenance section was better prepared for the emergency in terms of radio communication facilities than were units of the engineering divisions. But radio communications were difficult during the emergency owing to the great volume of messages being passed. Nevertheless it was for several days the only reliable source of quick communication. Many of the personnel in the engineering divisions did not have access to a radio and coordination among these personnel was often very difficult to establish. On the other hand, many of the trucks employed by the general maintenance section were equipped with radio and every foreman had access to a radio, making communication and coordination in that section of public works considerably less problematic than in the engineering divisions. Under the building construction and maintenance head, the Disaster Control Office tried "everything" to improve communications during the emergency period: runners, walkie-talkies, and radio. One of the major recommendations deriving from this disaster experience, in fact, was for a general improvement in the city's communication system.⁹

But even for the general maintenance section, given its greatly increased number of personnel, radio by itself was insufficient. Thus, a system emerged which combined radio facilities with face-to-face contact. One practice, according to the foreman who dispatched for the maintenance crews on Saturday and Sunday, was to send one man who would

contact the group of qualified people for any particular job. He would stay in constant radio contact with us until the job was completed, then he would come back.

Crew foremen, like these "contact" men, were able to transfer radio messages and information verbally to persons working in their area who were unable to use the radio themselves. Similarly, efficiency in the use of heavy equipment was increased by employing both radio and direct human communication. One maintenance man described how this permitted the sharing of emergency equipment among the several crews.

It was agreed that one foreman would call another and tell him that a certain piece of equipment was on the way to him. The operator of the equipment could do one job and then go on to another. That was the way it was going, around in circles, but everybody was doing a good job.

The equipment dispatcher described another process of locating equipment which also involved both the radio and personal, face-to-face communication.

There are men in the engineering department that have personal contacts with all the suppliers in the area, so, when we would put out a call: "Does anyone know where this particular piece of equipment could be located? If anyone hears this transmission, would you please reply." Then one of them would come in and say, "Yes, it's at a certain place. Do you want me to check to see if it's there and, if it is, stand by until you have the men come by and pick it up?" And we'd tell him, "Yes." So whoever located it would call back and say, "It's here. Send the men." I'd make sure that they were dispatched from here.

The process of communication during the emergency period is further discussed in the "services" section of this chapter.

Equipment Maintenance Section

One major alteration in the authority of the equipment maintenance section took place immediately following the earthquake. This change was not the result of the emergency, rather the emergency acted as a precipitating factor, demanding that the change be made then -- and not postponed any longer. As noted in chapter three (see footnote 6) the garage foreman and his superior, the superintendent of public works, did not agree on certain basic issues regarding the section. When the foreman did not report to work until his regular time, the Monday following the earthquake, the disagreements could no longer be put off, and his work for the organization terminated. His replacement -- the man who had been the day foreman -- initially held this new position on a tentative, emergency basis, final acceptance being contingent on his own decision. During the emergency period, in any case, he had assumed the authority of his absent superior, checking with him by telephone once or twice on Saturday and Sunday.

But the new foreman worked most closely with the superintendent of public works during the emergency period, who, like himself, was at the public works shop much of the time. Most of his contacts with the superintendent concerned equipment required either by his own mechanics or by maintenance crews in the field. When the foreman was not certain whether the equipment could be obtained, he would consult with the superintendent who in turn would issue a call for the equipment over the radio. Likewise, the foreman would inform his superior when fuel supplies were running low, and whenever the superintendent received requests for equipment and fuel by radio, he passed this information along to the new foreman.

As was true of the general maintenance section, much of the communication in the equipment maintenance section was face-to-face. This communication was directly with the foreman.

There wasn't anybody in the office. /He/ was the only one available. They contacted /him/ on the phone -- when the phone did get back in operation -- or they came down to the shop here.

Mechanics in the section indicated, however, that they received information and requests themselves from persons outside the normal authority system. Thus, one "old-timer" said, "I guess I have been around here so long that they just came in and asked me to go out and do it." In addition, so much maintenance and emergency repair was done in the field rather than at the shop that it was simpler to follow leads from one job to another in the field than to return to the shop each time for instructions. The same respondents also recalled that in the absence of official information they were generally prepared to make their own decisions.

Most of the guys took responsibility upon themselves. I know I did and it didn't make any trouble either. I just made a lot of decisions myself.

I was never actually stuck on what to do. I could make my own decisions if I had to. Then, if they didn't pan out, they could chew me out about it later.

If I didn't see /the foreman/ around, I would just take off and go and do what I was supposed to do and come back.

If something had to be done, you didn't wait for the foreman to come along and tell you to do it -- you did it.

This independence was possible primarily because the personnel of the equipment maintenance section, like the general maintenance section, knew what needed to be done. And, even in an emergency, what needed to be done differed only quantitatively from what normally needed to be done. The priority attached to the maintenance of emergency vehicles and vehicles employed in emergency operations -- and the importance of making the most efficient use of this equipment -- was shared during Time Two by virtually all of the members of the section.

The presence of a new foreman appeared not to result in any confusion during the emergency period. The new foreman's previous position in the section had been, itself, supervisory. Little actual change occurred in his tasks -- at least during the emergency. His final decision to accept the new post officially was made in collaboration with another member of the section, one of the senior men whom the foreman persuaded to take his own vacated position. These changes, however, were made official only after the emergency. In terms of the foreman's authority and relationship with the superintendent during the emergency, he had already assumed this new position.

Treatment Plant Section

Like the equipment maintenance section, the water treatment section added no personnel during the emergency; neither were any major changes in authority made after the earthquake. With one notable exception, the earthquake rather served to intensify the section's Time One decision-making independence from "the people downtown." That exception was the direct regulation of chlorine testing by the State of Alaska Department of Health and Welfare. The danger of contamination from the disrupted sewer system was the principal consideration in this change, but the plant foreman's insufficient knowledge of events in Anchorage also contributed to this decision. Normally chlorine tests are conducted by plant personnel with only relatively indirect supervision from the health department.

Although several members of the water division administration inspected the plant shortly after the disaster and radio contact with the utility office was quickly reestablished, plant personnel -- particularly the foreman who resides at the site -- maintained their independence during Time Two. The foreman, for example, did not leave the plant for a month after the quake. Unlike other section heads who made firsthand field inspections, the plant foreman depended completely on others' reports and radio communication for earthquake information.

Emergency tasks of personnel of this section, as described in chapter four did not differ radically from their "normal emergency" responsibilities -- the procedures remained consistent from Time One to Time Two and, generally, were followed without special coordination with water maintenance personnel. What was required was the continuation of the water supply into the distributive system. This was done almost independently of repair and maintenance work on the system itself.

Plant personnel did make use of their radio link with the utility office since this was the major source of information during the period: "I was asking a lot of questions," one member of the section said, "calling them and wondering how everything was coming and naturally I would keep in contact with them." Within the section, however, less radio contact was required. With the exception of the man in charge of the maintenance of the deep-well pumps, all the personnel operated at the plant so that face-to-face communication was generally possible. The pump man was an "old-timer" and his work was done autonomously.

Completely familiar with his responsibilities, the pump maintenance man was authorized to make all necessary supply and equipment requisitions without the specific approval of the plant foreman. Most of the suppliers from whom the pump man received material knew him personally -- in any case he had city-employee identification -- so he made all the contacts himself. He even ordered supplies from Seattle without having to obtain the foreman's endorsement. The order forms, approvals, and other paper work involving requisitions were completed after the emergency period.

This pattern (usual in normal times, too) was characteristic of all sections of the public works during Time Two. Requisitioning emergency supplies without the officially-required order forms and order numbers from the city warehouse was very common. Material was, in fact, "borrowed" from private persons and organizations during the first few hours of the emergency often without the permission of its owners; messages were left for the owners informing them of what had been taken. Similarly, much informal loaning of equipment among private and public organizations and much "buying" of supplies by city employees without official permission took place. But these patterns were not strictly emergency measures; they were Time One practices which sharply increased during the emergency period. The inevitable outcome of this practice, however, was considerable bookkeeping trouble when these unofficial bills came due.

Water Maintenance Section

Compared with the general maintenance crews, personnel of the water maintenance section were both better and worse prepared for the emergency: better, in that generally men on the crews were more experienced in the work they had to perform after the earthquake; worse, in that the lack of this same experience limited the effectiveness of volunteer and hired personnel taken on to meet Time Two quantitative change in tasks. Only four new men were officially hired and these men did not actually join the crews until after the emergency period. Three experienced valve men were sent to Anchorage by the Fairbanks water department but, again, these men did not join the maintenance crews until Tuesday, four days after the earthquake. During the emergency period itself, water maintenance crews worked on their own, augmented only by a few volunteers.

As experienced men on the sewer crews had done, the experienced water maintenance men (even those who were not officially leadmen) split up so that each worked with one volunteer and could act as informal, personal leaders. "That way," one of the crewmen said, "they could spread their forces over a greater area and succeed in getting more work done." Other shifts from standard authority patterns also took place in the section as a result of variations in the experience of employees. One of the foremen, for example, was new to his position and depended on the advice and experience of a senior crew foreman. And the manager of the division, also new to the work, depended on the foremen to make operational decisions. The general foreman, who normally had authority over the three crew foremen, stepped down during the emergency and functioned essentially as another crew foreman. Of these arrangements, a division administrator said:

The general foreman, if you go down the chain of command, he would be over the crew foremen, but as it worked out, each of the foremen more or less had a particular area of town he was working. In this manner, one foreman would be completely familiar with what was going on in one particular area of town. And we worked together that way.

The efficiency of this decentralization of authority during the emergency, according to this respondent, was closely associated with the magnitude and diffusion of the earthquake damage.

When you have as many problems as we did, it would have been impossible for one person -- including myself -- to get the grasp of everything that's needed. I thought it worked very well. We more or less split up the town and worked at it in different areas, different responsibilities.

This arrangement was followed among the men of the crews as well. There was some exchange of personnel as the crews moved from one job to another, this exchange dependent on the individual experience of the crew members. Thus, one foreman explained how he and his fellow foremen shared their men.

Because we had so few familiar men we had to know what the other crew was doing all the time. . . . One fellow, say, had been in an area three days before the earthquake and had been on a particular valve. Well, if he was working way over at the other end of town on another crew and I knew that, I would try and snatch him so it would be faster in finding the valve than it would have been if we had sent someone else or even myself out trying to hunt around in the snow for it. . . . So we worked pretty well together.

In addition, members of the crews, both leadmen and maintenance men, made many decisions crew foremen normally would have made: "Time and time again," one maintenance man observed, "we made decisions that should have come from a higher authority, but time wouldn't permit it." The priority on which these emergency decisions were based was a very simple one held in common by all members of the section: "What we were trying to do was to get water in the mains just as fast as we possibly could." Any man whose personal experience, relative to those around him, could contribute to satisfying this demand, made the appropriate decision.

These changes in authority were not without dysfunctional consequences. One maintenance man stated that the shifting of men from one crew to another, while it contributed to operational efficiency, also created problems. Men would find they had been given instructions by two foremen at the same time: "One foreman might have told you to go someplace and then the other would call you and tell you to meet him someplace else." Like the unofficial pattern of requisitioning supplies, this practice of shifting men from one crew to another was also characteristic of Time One. Thus, the difference between normal and emergency occurrences of this pattern was quantitative rather than qualitative. The problem was aggravated during Time Two by the attempt of one of the foremen to stay with his men all the time instead, as he later suggested, of depending more on their own judgement. This lesson he had begun to learn during normal operations but learned even more quickly during the emergency.

Communications among members of the water maintenance section were by radio and face-to-face contact. The pattern of shifting men among the various crews made communication especially vital: "Without the radio," one foreman observed, "I think we would have been dead." Indeed, his only criticism of the section's operations was of a crew foreman who used the radio too much. The radio was so busy, this informant said, that he had to "sneak" his messages in: his co-worker's monopoly of the facilities did not add to the efficiency of communications.

Water maintenance crews called upon members of the public works engineering sections for the same reasons sewer crews did. The section's utility maps and installation plans were frequently incomplete, making the location of valves difficult. To determine whether this information was available in the engineering offices, the water foremen contacted the thirty-nine engineers by radio and had them look up the necessary data. When their records were incomplete, maintenance crews relied on the memory of "old-timers" or searched for the installations. The latter process was, clearly, a major cause of delay in the restoration of services. Nonetheless, the manager of the water division and his superior, the director of public works, were much impressed with the speed of the repairs. "Give the credit to them," one administrator said of the maintenance crews, "they did a tremendous job."

Where changes in authority in maintenance sections of the public works occurred during the emergency period, they occurred in the context of Time One authority patterns. Without exception, maintenance personnel, regardless of their tasks, remained in their sections and did not, like some engineering personnel, find themselves working under completely new supervisors. Neither were there instances of the loss of authority as occurred with the building inspector and the head of the Disaster Control Office. Changes in the maintenance sections were, in fact, official emergency promotions which followed the normal links in the chain of command. The basic cause of this distinction appears to lie in the new priorities and tasks which the disaster demanded of engineering personnel as opposed to the task continuities it evoked of maintenance personnel.

In the final section of this chapter, authority patterns within the service and administrative sections of the public works are considered. The distinction between Time One and Time Two is here less clear-cut and appears to fall somewhere between those of the engineering and maintenance sections.

Service and Administration

Customer Service Section

You just did what you saw to do. You couldn't wait for somebody to tell you and the people couldn't wait for you to say, "Well, I don't know." So you just assumed an awful lot that you weren't told to assume.

Thus a member of the customer service section of the water division summarized his Time Two authority. He went on to explain the unclear relationship of his new authority to his new tasks.

I didn't even know I was supposed to be doing what I was doing. Just when people came in and asked me this or that, I just gave them an answer. /The manager/ was in the field, so somebody would have to answer.

He acted during Time Two essentially as an individual, rather than as a member of a section. The other members of his section, whose normal tasks were irrelevant to the emergency, had assumed or been assigned new tasks by other members of the public works. The supervisor of the section, in a literal sense, had no one left to supervise, and he operated largely as a fill-in where assistance was required. Thus, because he had had some experience with radio, he took over the City Hall radio during much of the emergency period. "The girl that was the normal switchboard operator was operating the radio," it was reported, "and she was getting completely frustrated, so /he/ took over." This was his own decision. The manager of the water division was not available for consultation and there appeared to be little in the supervisor's normal responsibilities which was relevant to the emergency, so he assumed this task as the most useful under the circumstances.

His relationship with his superiors -- and the water division's relationship in general with the administration -- was largely ex post facto. The supervisor informed the manager of decisions after the fact and the manager, in turn, passed on progress reports to the administration after the progress had been made. "We were still part of the public works," one respondent said,

but we completely bypassed the director of public works. We acted just like he wasn't even there. The assistant director of public works, we would hand him our progress report and that would be about it. All decisions came directly from this division and were put into effect without any assistance or guidance from the city manager, director of public works, or the city council. Now normally it wouldn't be that way whatsoever. Those are the channels that we cut.

He added that it would have done the administration little good to complain since "we had already done it or it wouldn't have been written down."

Sanitation Section

Like members of the customer service section, personnel of the sanitation section were employed during the emergency period in tasks they normally would not have performed. In the course of performing these tasks, they were directed by public works supervisors outside the sanitation section.

In particular, a number of sanitation men worked with the sewer foreman of the general maintenance section. During Time Two the head of the section was also engaged in unusual tasks: he dispatched for the maintenance division during much of the emergency period, working at this task under the direction of the public works superintendent.

By Sunday -- when gravel-fill operations had opened up most heavily damaged streets -- sanitation operations began systematically. Up to that time, nothing had been done to remove the five trucks from the collapsed garage, although some preliminary efforts to obtain the heavy equipment for the project had been made. Similarly, nothing systematic had been done to provide Anchorage residents lacking sewer facilities with emergency substitutes, although, again, orders had been placed through civil defense for chemical toilets and collection barrels. On Sunday, however, the members of the sanitation section who had been engaged in other emergency tasks were called back to their own section and worked again under their own supervisor.

At this time a major shift in authority took place. The sanitation foreman was still dispatching for the maintenance division and his assistant, the sanitation officer, was serving with the National Guard. In the interim, the sanitation section had been headed by a driver -- a man who had been with the public works for eleven years. He was made temporary sanitation officer and took over the coordination of the section's personnel until the sanitation foreman was free to resume his responsibilities.¹⁰ It was reported:

He took it over real well. He was thoroughly familiar with the job and with the town and he took hold and did a real good job. He ran the crew for /the foreman/ while /he/ was dispatching that Sunday.

Other changes followed from this promotion, although these were changes with less impact on section authority patterns. Some additional personnel were taken on to handle the increased work load following the disaster. For drivers to work efficiently, particularly in areas drastically disrupted by the earthquake, they had to be familiar with the city. To this end, the temporary sanitation officer split up members of his old crew, made two of the men drivers, and placed them in charge of crews made up, in part, of new emergency personnel. Estimates were that five or six new men were hired after the earthquake.

Especially while the sanitation officer took his supervisor's place, decision-making power was delegated, unofficially, to sanitation personnel normally not exercising it. Drivers made decisions themselves during the emergency, particularly when persons who possessed authority were not available. They added, however, that they always informed their supervisors of the action they had taken. One supervisor declared that all levels of the organization followed this practice.

There was never any attempt to deliberately evade the chain of command. It was just a matter of

shortening it up. The director of public works would go directly to the head of a section to ask him what was being done there, what needed to be done, or to gather information to give to some other agency.

Of his own activities, this respondent said:

After I had started doing it, why, the superintendent of public works/ came on the job and told me it was all right -- to go ahead. We made our decisions on our own and made our superiors aware of them afterwards.

Communication within the sanitation section was by radio. As members of many other sections of the public works had discovered, sanitation personnel found that radio was both the most efficient and yet a most clearly limited medium. One sanitation worker suggested that any improvements made in the existing system ought to include augmenting the one available frequency with at least one more, so as to allow more immediate access to the radio during emergencies. "We would have had a lot better communications," he said, "if we had broken it up into different frequencies and had more radios on hand."¹¹ But without even the somewhat limited radio facilities it had, the section would have been severely hampered. The sanitation officer depended almost exclusively on radio contact with City Hall Annex to avoid gaps in the emergency sanitary system:

He was in close contact with the City Hall Annex. Anybody that needed a waste barrel would call the Annex and they in turn would just relay it to him.

Some difficulties developed in this communication process, particularly as it involved other organizations. Requisitions for emergency supplies were made through civil defense but, it was reported, the sanitation section was not always informed when their supplies had been received. Thus, chemical toilets remained in storage for two days simply because the sanitation personnel did not know these supplies were available. One member of the section explained how this happened.

You can plainly see how it happened. The civil defense had all volunteer help, you know, and they weren't aware of the situation, so they set them aside. Well, here we had people screaming for these toilets all over town and we couldn't supply them because we didn't know where they were.

Some independent action was taken by the section foreman to help avoid this delay. One member of the section was stationed at the airport to set up a separate warehouse for sanitation supplies and to keep the foreman informed of shipments and available equipment. No arrangement of this kind had ever been required before.

Administration

Even during normal times, members of the administration of the public works -- the director and his assistant particularly -- tend to take a less active role in the operations of the department than in policy-making decisions. Both the director and the assistant director are engineers rather than administrators: this results in considerable autonomy among operational division heads. The emergency demanded quick action from many sections of the public works, especially from maintenance crews, sections about which the various operations foremen knew more than the engineer-administrators. As a result, the emergency increased the independence of these sections; neither the director nor his assistant became actively involved in any of the maintenance operations

The director and assistant director functioned rather as reconnaissance personnel, conducting general inspections of the damage and passing this information on to maintenance supervisors and foremen. A number of supervisors and foremen and several of the maintenance crew members themselves said that during the emergency they had received information pertinent to the damage directly from the administration. The director and assistant director were more likely to make specific operational decisions affecting the activities of engineering rather than maintenance personnel. The administration, for example, denied the Disaster Control Office the use of explosives in securing damaged buildings in Anchorage. The decision to phase out operations of the Disaster Control Office two days after the emergency period also originated in the public works administration.

But the assistant director took on some specific responsibilities during the emergency. He acted as liaison for the maintenance sections and the head of the construction section in the location and disposal of heavy equipment. In these activities he acted on behalf of any public works personnel who required additional equipment, although, on occasion, his orders came from the director.

That the assistant director assumed these responsibilities was the result of an attempt by the public works administration, mayor and city manager to organize emergency requisitioning and construct some general picture of the extent of the earthquake damage and the city's response to it. A meeting was called for 3:00 Saturday morning to which all municipal supervisors and section heads were invited. Under the leadership of the mayor, the meeting was the first systematic attempt to facilitate inter- (and intra-) organizational coordination. A public works administrator described the meeting this way.

It was conducted by the city manager and all the department heads were there -- the municipal light and power, the telephone department, the councilmen, the mayor, the city engineer /i.e., the director of public works/, the Army and the Air Force. Doctors were there; everybody was there. There was

standing room only -- and that was out in the hall.
The place was just packed.

The major portion of the meeting was taken up with reports on damage and emergency actions from each of the city organizations. It was at this meeting, for example, that the manager of the airport announced that his facilities had sustained almost no damage and that he would not require assistance from any other public agency. In addition, other organizations, like the military, the Salvation Army, and Red Cross reported on their capabilities, requirements, and emergency operations.

One result of this meeting was the designation of the local civil defense organization as coordinating center for equipment and personnel requisitions. The assistant director of public works, then, acted as liaison between public works and civil defense, passing requisitions on to the latter organization. The results of this change were described by an administrator as generally successful.

You could definitely see the smoothness begin to take effect. The minute it was initiated it irritated some people because they found that they couldn't go directly to the source of equipment. . . . But orders were to come by a certain method and that was it. It irritated some people that knew that they had to have something . . . but we couldn't allow them to go directly to these people. We told these agents . . . to take the information but not to act on it until it came from the proper channel, so we would know what the devil was going on.

But other members of the public works suggested these "proper channels" were not always followed during the emergency.¹² This disparity, however, may reflect the widespread procedure, even during normal times, of allowing foremen and section heads to requisition supplies and equipment to certain limits in cost without the approval of the administration and the practice of requisitioning supplies before completing order forms and warehouse authorizations. Whatever the explanation -- "there simply wasn't time" is another alternative -- the practice continued and the result was considerable confusion in the bookkeeping offices after the disaster.

With the possible exception of the ban on the use of explosives and other limiting orders, the director and assistant director were infrequently called on to make specific emergency decisions. Indeed, because the section and division heads tended to act relatively independently, the director and his assistant had few opportunities to make such decisions. As was true of the chain of command generally, the director and his assistant were more likely to be informed of public works activities after those activities had been performed. Their approval was, then, after the fact.

This pattern appeared in the decision making of the superintendent of public works and his assistant. The superintendent made more independent decisions during the emergency than he would have made during normal times. But this was true for all the men in the maintenance division. Only on major decisions affecting the operations of the entire division -- as did the change in sewer operations -- did he purposely seek out his own superiors for their approval. Similarly, another division supervisor noted that members of the maintenance division

did not worry too much about whether the superintendent said to do something or I said to do it because everybody knew that "Let's get it done" was the thought in mind.

On the other hand, the administrative assistant, who is normally outside the operational chain of command, found during Time Two that his new tasks required him to make decisions affecting field crews and their tasks. Beginning on Sunday, when he returned to work, he was involved in the hiring and dispatching of emergency personnel, tasks which he coordinated with the sanitation foreman. Together they would determine the personnel needs of maintenance and repair crews, hire the men, and dispatch them. In addition, the administrative assistant also relayed damage reports and requests for repairs to crew foremen or, if they were unavailable, directly to maintenance men. The emergency placed him in a position indirectly, if not directly, associated with public works field operations, a position alien to his Time One location. The paper work he normally performed full time was altogether lacking from his Time Two responsibilities. This was itself as graphic as any indication of the difference between his normal and his disaster tasks.

Probably because the principal task of an administrator is the making of decisions -- the exercise of authority -- the difference between Time One and Time Two for public works administrators was often described in terms of the diffusion of their decision-making authority. Decisions normally deferred by crew members to foremen, or by foremen to section heads, supervisors, and administrators were made by persons who officially and normally would not have made them. But the increased numbers of activities and the priority on speed during the emergency meant that administrators themselves had more demands placed on their time and attention. Thus, they shared normal decision-making authority with those who held lower positions in the hierarchy.

Conclusions

This chapter completes the presentation of data begun in chapter three. The present chapter, however, is most clearly associated with chapter four in which a descriptive analysis of emergency tasks was presented. In this present chapter the authority structure of the public works during the emergency period has been described.

The most radical changes in authority, as in tasks, took place in the engineering sections where the earthquake may be said to have provoked a

"disaster," in the sense of a situation almost completely discontinuous with normal times. Tasks and authority relationships were altered considerably in an attempt to define the new Time Two responsibilities of engineering personnel. For operational personnel, on the other hand, the earthquake was an "emergency," of much wider scope than any previous emergency, but nonetheless, a situation which required no major changes in tasks. Nor were alterations in authority relationships demanded, other than those which occurred within the existing structure. Engineering personnel assumed certain new responsibilities, maintenance personnel were promoted to them. The distinction is an important one.

Administrative personnel shared their decision-making authority with other members of the department. Certain office personnel -- the administrative assistant, for example -- found themselves more actively involved in the operations of the public works than had been true of normal times. As a result, they also were involved in the expanded and diffused decision-making process. Finally, service personnel -- customer service representatives of the water division and sanitation employees -- whose regularly scheduled activities were temporarily irrelevant to the disaster were absorbed by other operational units. Sanitation personnel returned to their own section rather quickly owing to the essential nature of their normal services. Indeed, with the disruption of the sewer systems, they took on a greatly expanded work load. But, like Time Two maintenance tasks, these were similar to Time One sanitation activities.

In the following chapter, the major themes of this report will be brought together and their relationship to certain hypotheses in disaster research explored.

FOOTNOTES: Chapter V

1. One of the survey engineers who reported back to work Sunday afternoon said that, after the fact, he realized that he should have returned to work immediately following the earthquake.

One of the things that I probably should have done was come down here right after the quake and take charge of the file room so that nobody would run off with anything that we have here. We missed some drawings. Somebody came running through here . . . and grabbed up a few drawings that we still haven't found or been able to replace.

2. One member of the survey section noted that there were persons outside the public works who also had this kind of information. One engineer, for example, who had designed much of the sewer system offered his services during the emergency period. Unfortunately, his offer was not accepted until several days later: "You might say they probably wasted a day that they could have utilized his services," this respondent commented.
3. "It was a pretty silly idea to start with as far as that's concerned," he added as an afterthought to this description.
4. There is some confusion relating to the decisions on the Penney demolition project. One DCO respondent admits that his supervisors did not approve of the project, but added he had also decided against it. Yet in an earlier interview with members of the Disaster Control Office, it was stated:

It is our considered opinion that we should have gone further with this /i.e., demolitions/ than we did. We were stopped by other agencies.

This view of the events is supported by a public works administrator's description of the decision.

/Members of DCO/ came to me on two occasions with requests to use dynamite. And, under the ordinance I do have the authority . . . to give permission to use explosives. However, that is usually in the absence of the director himself. The director was not absent, in a sense, because I could contact him by radio. But /DCO/ was rather insistent that /they/ should use dynamite, explosives, and demolition. I got hold of /the director/ and in turn we got hold of the city attorney to see what other implications could come from this and then, of course,

we made a rapid inspection of the situation to determine whether or not it was necessary to use explosives. And, you may or may not know, there were none used.

One suspects the situation was subsequently redefined, perhaps by everyone involved.

5. This respondent went on, however, to admit that he was still (at the time of the interview three months after the disaster) "wondering what all that was about".

It was either the building /inspection/ division or the /building construction and/ maintenance section. I've still got a few questions about that group. . . . Now just what beneficial results they had and whether they worked in conflict with the building /inspection/ division or helped them, I'm not sure.

6. He went on to describe his own confusing experiences with passes during the emergency.

There was quite a little difficulty getting around by car. A lot of different people had a lot of different ideas of security and nobody had any official passes. A pass from one department wouldn't be recognized by another and there was a lot of interference with work because of no central pass. I could get around about as well without a pass as any other way. I carried a letter from /the head of the Disaster Control Office/, which sometimes entitled me to enter. But they wouldn't let me through in some other places. Lots of times the military wouldn't let me through at all and I had to go around some other way: call a policeman and explain to him and perhaps the military would let you through if a policeman would vouch for you.

7. If the lines of authority are followed exactly, the head of the building inspection division holds a slightly higher position than the head of the building construction and maintenance section.
8. However, he also took the view that the new organization acted inside the bounds of the public works. Despite new tasks and new authority, despite a new name, the DCO was, he suggested, still a part of the public works. In the following exchange he made his point clearly:

Interviewer: Was /the coordinator of DCO/ operating as an authority of the public works department during the emergency?

Interviewee: Yes
Interviewer: Did he identify himself as such?
Interviewee: Oh, sure. Instead of building construction and maintenance, he became building demolition and search. But it's all part of the department, it's part of this division.

9. From the DCO's after-action report and recommendations the following indicates the importance attached to an improved communications system.

This is the first thing that usually gets goofed up, be it war, peace or disaster. Without it we can be no more than a bunch of individuals running aimlessly around, getting very little done. With good communications, we can be an effective and efficiently operating unit. . . . KEEP IT IN MIND
-- WE CAN NEVER HAVE TOO MUCH COMMUNICATION.

10. The temporary sanitation officer subsequently assumed that position permanently, a promotion which apparently took place largely as a result of the emergency.
11. This was a suggestion made by many of the public works supervisors after their experience with the earthquake.
12. Although the data are inconclusive, at least one member of the public works indicated that he channeled his requisitions through a local official who had personal ties in Seattle, thus apparently ignoring the assistant director and the civil defense altogether.

CHAPTER VI

THEORETICAL SUMMARY AND CONCLUSIONS

Two theoretical formulations were employed in structuring this monograph. The "demand-capability" approach introduced in chapter one provided concepts which were incorporated in all subsequent chapters. The temporal distinction between Time One (normal times) and Time Two (the emergency period) as well as distinctions among tasks, authority (decision making and chain of command), and communication derive from this first formulation. Expectations of the nature of the changes in tasks, authority, and communication from Time One and Time Two were also drawn from this first approach.

The second formulation, a typology of emergency organizations, suggested the engineering-maintenance-service classification employed in previous chapters. Certain expectations that this typology generates also contributed to the discussion of these three functional units of the public works. Thus, in addition to presenting a descriptive case study, this monograph has attempted to show the usefulness of these tools of analysis by employing them as ordering devices.

This final chapter is divided into two major sections, each devoted to a summary of the data which fall more logically under one formulation as opposed to the other. However, the goal of this treatment is less to distinguish between the two as to demonstrate how, in the case of the Anchorage Public Works Department, these two analytical devices complement each other. The final section of this chapter presents certain specific characteristics of the public works suggested by that organization's response in the 1964 earthquake.

Demands, Capabilities, and Stress

An organization makes certain demands of its members. It demands that its members adequately perform certain tasks in exchange for which the organization provides certain rewards. In an analogous sense, community demands are made of the organization as a whole, most clearly when the organization is a "public" element of government. Thus, the Anchorage Public Works Department is charged with maintenance of streets, sewers, and the water systems, and with certain planning and engineering tasks, in exchange for which the community has agreed to provide economic support for the organization.

At the level of individual employees and the organization as a whole, these demands (when they are accepted as legitimate) are arranged in a hierarchy, in which they are ranked according to the relative importance attached to each. In this form the demands may be said to have been assigned certain priorities: if task A has a higher priority than B, then in any situation which requires a choice, A is to be satisfied first. Thus, the several tasks of an organization, or of a unit within an organization, or of an individual member of an organization, have certain priorities attached to them at any

given time. Implicit in this arrangement is the idea that, if at any other time capability to perform all of these tasks is limited, those with the highest priority will be attempted even at the expense of the others.¹ These demands constitute the first half of a ratio; the idea of capabilities comprises the second half.

A third element of this scheme, "stress," is defined in terms of emergency demands and capabilities. Stress may be said to characterize a situation when organizational demands rise to such a level that the capabilities of the organization are insufficient to meet them. A stress situation might also occur if capabilities were diminished to such an extent that even normal demands could not be satisfied. Or stress could follow from a combination of rising demands and diminishing capabilities. The archetype of the latter situation would be, of course, a disaster.

Thus, under stress conditions, certain changes are expected in both performance structure (tasks) and normative structure (authority). Generally speaking, these changes are quantitative and qualitative: first quantitative increase in total tasks performed and, second, qualitative change in the kinds of tasks undertaken are anticipated. In addition, as the degree of stress increases, both the total number of decisions made and the number made by unofficial decision makers increases.² The data from the Anchorage Public Works Department substantiates these two expectations.

Members of the public works were virtually unanimous in noting the significant increase in tasks during the emergency period. There was more to be done and, excepting street maintenance sections, there was no substantial increase in the number of personnel available to perform them. Maintenance sections -- streets, sewers, and water -- experienced the greatest quantitative change in tasks. Their tasks, however, were essentially those they performed during normal times. This continuity in tasks from Time One to Time Two had important consequences for the Time Two authority structure of maintenance sections.

Because maintenance personnel were familiar with the tasks they were called on to perform during the emergency, no radical change in authority relationships was required. A number of lead men were promoted to foremen and other experienced employees took on the responsibilities of lead men vis-à-vis the emergency personnel added to the crews. But these changes did not constitute departures from normal lines of authority. Crew foremen remained in charge of maintenance activities; crew members continued to take their orders from foremen. Responsibility in decision making was increasingly diffused down through members of the sections, but in every instance of enlarged responsibility, employees indicated they attempted to keep their supervisors informed of any decisions made in the supervisors' absence. Although the chain of command was truncated, it remained the basis of all authority relationships. What might be called "ex post facto authority" was frequently sought, and granted.

Quantitative change in tasks and official changes in authority among maintenance personnel stand in contrast to the qualitative and unofficial changes which occurred in engineering sections of the Anchorage Public Works. Although it is likely that engineering personnel also performed numerically more tasks during the emergency period than they would have in normal times, they were less impressed with this change than with the qualitative changes in tasks which set off the emergency period from Time One. Search and rescue, sewer inspection, and field work were alien to the normal tasks of engineers, yet these were the activities they were involved in during the emergency. Time Two task priorities of maintenance personnel differed very little from the priorities which inform "normal emergencies," but for many engineering personnel the context of their activities changed so radically that no continuity between Time One and Time Two existed at all.

In the absence of any disaster plan or predefined emergency responsibilities for engineers, their activities after the earthquake -- if they did anything as public works employees -- were largely ad-libbed. Maintenance men, as was suggested in chapter four, did what they knew had to be done; engineering personnel, on the other hand, did what they saw had to be done. Indeed, it may legitimately be argued that maintenance personnel possessed an implicit disaster plan insofar as they knew what was expected of them in emergencies. Although few had experience with so widespread an emergency, all "old-timers" among maintenance personnel had been through the spring thaw, Anchorage's "annual emergency," and the demands and priorities of that situation applied with equal relevancy to the earthquake.

Few of the engineers had such firsthand experience. Thus, in the disaster environment, they found a situation for which they had no specific definitions of appropriate tasks or priorities. Their status as public employees, particularly those in supervisory positions, suggested only that they ought to do something. Consequently, they took on new tasks as the situation seemed to demand. But normal lines of authority often bore little relationship to these Time Two activities. Personnel from one section worked under the direction of supervisors of other engineering sections and, at least in one instance, a supervisor lost his position of authority altogether.

Duplication and a certain amount of inefficiency were the necessary consequences of these departures from normal authority. Some time was required before new authority relationships and divisions of labor were clarified. Not until Sunday were these new patterns clear to many of the engineers, and, until that time, coordination of the activities of engineering personnel was problematic -- if not impossible.

Difficulties associated with coordination are illustrated by the emergency relationships of the administration of the public works with various division and section heads normally responsible to the director and his assistant. The Time One autonomy of units of the public works increased during the emergency. This increase, however, especially in the engineering divisions, was not formally determined: it emerged out of the emergency situation. Administrative personnel typically discovered what engineering supervisors were doing after they had begun doing it, and only infrequently as in the

question of the use of explosives did members of the administration exercise their veto power before the fact. The attempt, for example, of the assistant director to structure equipment and supply requisitioning during the emergency was in part unsuccessful because the lines of authority normally linking him with supervisory personnel had already been lost and other, unofficial links had emerged in their place. In addition, the tasks engineers accepted during the emergency demanded immediate attention -- "We saw what had to be done and we did it." By their definition of emergency responsibilities, there was no time to seek out official sources of approval before initiating some activity.

Thus, both the kinds of tasks which engineers performed and their definition of why they performed them contributed to the breakdown of the normal chain of command between administration and section heads. Also associated with these changes in authority was the independence administrative personnel normally granted section heads, independence which section heads could easily increase during the emergency and which the administration found difficult to limit. During the emergency, according to one engineering section head, the organization "broke up into various little zones in the absence of any central command, doing what had to be done. This, I think was pretty general throughout the whole organization."

This atomization of the public works during the emergency had, as described in chapter three, its precedent during Time One. The process of separating divisions and sections in the public works had already begun before the earthquake. The water division, for example, had been created only six months before. Some engineering divisions, notably traffic engineering and building inspection, were engaged in a more or less active campaign for complete autonomy from the public works, autonomy which was, in fact, gained by the end of 1964. This strain toward autonomy may have infected other units in the organization, especially in the engineering division, so that action independent of the public works administration was seen as desirable in itself. The disruption in normal patterns which accompanied the earthquake was, then, an ideal opportunity to demonstrate the "advantages" of this independence.

If, as the demand-capability ratio suggests, the extent of changes in tasks and authority during an emergency is an index of the degree of stress in an organization, then the engineering sections of the Anchorage Public Works Department must be seen as experiencing more stress after the earthquake than the maintenance sections. The capabilities of the maintenance sections -- both in terms of personnel and equipment -- were quickly augmented by local contractors whose men and machinery were employed by the public works in meeting the clearly defined but increased demands of the emergency. Demands made of engineering personnel were not clear enough to determine who or what was required to meet them. Volunteer personnel were assigned to tasks in the same ad hoc manner as public works engineers were. Here, then, is another difference between these two elements: engineering sections, when they increased in size, were augmented by walk-in volunteers; maintenance sections, particularly street maintenance, were enlarged by hired personnel.

The task engineering sections were best prepared to perform during the emergency however, providing technical information concerning the type and location of municipal installations, was frequently limited by the inadequacy of available maps and plans. Because plans of older sewer installations were either missing or incomplete and because some of the newer installations had been made by private developers and purchased from them by the city, locating underground installations was at times very difficult. Here the knowledge of certain individuals, both within and outside the public works, was invaluable. Engineers who had participated in the design of sewage systems or maintenance men who knew from previous experience where these installations were could fill the gaps in official records. This resource was difficult to draw upon, as it depended on public works employees knowing that certain "old-timers" possessed this information and on these "old-timers" being available.

Engineering personnel, then, faced uncertain but increased demands with, in some instances at least, fewer personnel than normal. As was noted in chapter four, the uncertainty of engineers' Time Two responsibilities led to the absence of some of these personnel until relatively late in the emergency period. This reduction in personnel, in addition to normally loose ties with the administration and important gaps in their information resources, all contributed to major changes in tasks and authority during the emergency. During the same time maintenance personnel completed emergency repairs to city streets and made considerable progress in the restoration of water service. This contrast is best explained by the simple distinction between knowing what has to be done in an emergency situation and having to ad lib responses to a disaster.

Disaster, Emergencies, and Organizational Response

In chapter four it was suggested that the terms "disaster" and "emergency" might be useful in distinguishing between two varying perceptions of the same extreme situation. When an altered environment demands qualitative changes in tasks (and, perhaps, quantitative changes as well) organizations experience a "disaster"; when an extreme environment demands only quantitative changes in tasks, organizations experience, it was suggested, an "emergency." In the public works, this distinction may be applied, respectively, to the engineering and to the maintenance sections. Following some brief comments on disasters and emergencies, this distinction will be considered in the context of Quarantelli's typology of organizational response (introduced in chapters one and four). This typology adds significantly to the understanding of the Anchorage Public Works Department during the two days following the 1964 earthquake.

An extreme situation may be viewed from two perspectives. On the one hand, it so disturbs an environment that many normal patterned activities and structured human relationships are interrupted, if not totally suspended for a time. In this sense, an extreme situation constitutes a new environment -- or better, disrupts the normal environment to the extent that it becomes virtually a new one. To this new environment individuals, groups, organizations, and the larger social system of which they are a part must adapt.³ Thus, the

radically altered (or "new") environment is discontinuous with the normal environment; Time Two is discontinuous with Time One. That an event is defined as disastrous itself carries this connotation. The disaster becomes a wholly separate and distinct event that differs in kind, not simply in degree, from normal events.

On the other hand, the response of those who suddenly find themselves in an extreme situation is not solely determined by these new conditions. For all individuals there are definitions of the relative importance of activities, ideas, and things which carry over into even the most extreme situations. These priorities are implicit in normal patterns of human life, certain of them becoming explicit in extreme situations. Typically issues like individual life and death and the sheer physical survival of social entities receive highest priority. These priorities are not new; insofar as they underlie normal patterns, they may be said to emerge out of Time One. The term "emergency" once possessed exactly this meaning: the act or process of emerging -- a meaning which suggests the necessary continuity between normal experience and extreme situations.

In the broadest sense, disaster priorities and emergency priorities, then, do not require a forced choice between one or the other, but together characterize the response of individuals or social groups to extreme situations. The question is the extent to which one or the other dominates the response.⁴ It is possible to ask this question in terms of organizational units. Time One engineering tasks and priorities had little relevance to the disaster environment and major changes were required. For public works engineers, therefore, the earthquake produced a new environment to which they adapted with new tasks and new authority relationships, that is, the situation required disaster priorities. For maintenance personnel the earthquake produced an emergency requiring only quantitative changes in tasks and authority. Normal priorities were carried over, with little or no change, to the emergency situation.

Quarantelli's typology of organizational responses to extreme situations, although it does not deal with this distinction in these terms, adds another dimension to this discussion. According to his formulation, two types of organizations are involved in extreme situations. First, established organizations respond to a crisis, normally with little or no change in personnel or structure. Second, certain other organizations respond to extreme situations, but usually acquire additional personnel and often undergo structural changes as well. Both types Quarantelli, Dynes, and others call emergency organizations, although the second type is more properly designated as having latent emergency functions.⁵ Examples of established emergency organizations include police and fire departments and, of latent (emergent) emergency organizations, such volunteer associations as Red Cross and The Salvation Army. In both types, provision for response to extreme situations is, in effect, built into normal operations and structures of the organization. This is the meaning of the term "emergency" in this monograph's distinction between emergency and disaster.

A second dimension in Quarantelli's typology is introduced by the distinction between regular and nonregular tasks. Again, this meaning is included in the distinction between emergency and disaster in this monograph. Quarantelli's idea is that some organizations are prepared to respond to extreme situations by performing essentially the same tasks they would perform in a normal environment, while other organizations, if they respond as organizations at all, must necessarily engage in tasks which are nonregular, i.e., tasks which differ from those they normally perform.

When these two dimensions -- established-emergent and regular-nonregular -- are combined, the result is the fourfold classification of the types of organizational response to extreme situations presented in chapter four. Type I designates established organizations which respond to extreme situations by performing regular tasks, that is, organizations which are prepared to operate in extreme situations without undergoing radical change in personnel, authority relationships, or tasks. Type II refers to organizations which emerge in an extreme situation, organizations which usually take on additional personnel and often alter their normal authority relationships, but perform traditional, although not everyday tasks in a crisis. As was suggested, the clearest examples of these two types are emergency organizations such as the police force on the one hand, and, on the other, voluntary associations like the Red Cross.

Types III and IV refer to organizations which engage in new tasks as they respond to extreme situations. Type III organizations are those which exist in Time One, but which are not emergency organizations as that term can be applied to Types I and II. Rather, they are organizations which normally perform tasks having little or no direct relevance to extreme situations. To the extent that members of such an organization respond to a crisis, they necessarily take on new tasks, often supervised by personnel of Type I or Type II organizations. In Anchorage the numerous private contractors who offered their personnel and equipment to the public works after the earthquake illustrate the pattern associated with Type III organizations. One essential characteristic of this pattern, according to Quarantelli, is that "the participants are primarily acting on the basis of their pre-disaster group affiliations."⁶ Accordingly, individuals who volunteer their services as individuals -- apart from any organizational ties they may possess -- do not belong in this category.

Type IV organizations are created by the extreme situation: they do not exist, as distinct organizations or groups, prior to the crisis. Even more emergent than Type II organizations, Type IV organizations form to satisfy specific demands of the situation and, almost as quickly, dissolve when the crisis has passed. The demands which give rise to Type IV organizations are frequently associated with crises involving a number of separate organizations, that is, crises which are community-wide and require the mobilization of police and fire departments, volunteer organizations, and, perhaps, Type III groups which are normally not expected to engage in emergency activities. In these circumstances a need for coordination among the various organizations often exists and some kind of Type IV group may emerge in response to this need. Demands for interorganizational control and/or a central source of information may also contribute to the formation of Type IV organizations.

In its initial formulation, this typology applies to the several organizations which may respond to an extreme situation. Indeed, one of the expectations which derives from this typology is that the extremity of a crisis may be indexed by the type of organizations which respond: when Type I organizations are sufficient, the situation is likely to be less extreme than those to which Type II, or Type II and Type III organizations also respond. This same typology may also be useful in the analysis of a single complex organization like the Anchorage Public Works Department, an organization which includes within its divisions and sections several distinct groups, i.e., engineering, maintenance, and service units.

The differences between an emergency and disaster suggested above are derived, in part, from comments made by respondents in the Anchorage Public Works Department. This distinction also parallels Quarantelli's formulation: Type I groups responding to an emergency and, at the opposite end of the scheme, the emergence of Type IV groups being a clear index of disaster. This suggests that it may be useful to consider the response of the maintenance sections of the public works as an example of Type I or emergency response and those of the engineering personnel as Type III or disaster response. Certainly Quarantelli's typology would add to the understanding of the emergence and operations of the disaster control office since that group may now be seen as an example of Type IV organization. Neither the emergency-disaster distinction nor the typology of organizational response applies as readily to the service and administrative sections of the public works. However, with some reservations, these analytical devices may be applied to them as well. The remainder of this section has been devoted to these analyses.

Of all public works personnel, those who were members of maintenance sections were best prepared to respond to the effects of the earthquake. As emergency units within the organization, they possessed the necessary experience to begin the massive tasks of restoration of the city's street, sewer, and water systems without extensive reorganization or emergency instruction. The addition of personnel and equipment to the street crews generally increased their efficiency since the new men were given tasks for which their normal employment had prepared them, despite the fact that during Time Two they worked for the city.

The limited number of personnel in the sewer crew -- and the frequent lack of necessary maps and other information -- restricted to a certain extent the efficiency of that group. In any case, highest priority was given to emergency street repairs since without access through the damaged areas of the city, repairs to sewer and water systems could not begin. New personnel on the sewer crews required several days' active experience before they could function independently. Similarly, the water maintenance crews, when they were expanded, added experienced personnel loaned by the Fairbanks water department.

With the exception of the street crews, for which experienced personnel were locally available, few maintenance crews added significantly to their numbers during Time Two. Again, it is illuminating that those personnel who did join the maintenance crews of the public works were taken on, not as

volunteers, but as paid employees, with the understanding that most of them would work for the city only during the emergency. Emergency groups, according to Quarantelli's generalizations on Type I organizations, "tend to use only their own personnel or almost identical personnel from similar groups elsewhere."⁷

If the characteristics of Type I organizations suggest that maintenance sections of the public works belong most logically in that category, Type III recalls the activities of the engineering personnel. Engineers took on a variety of new tasks during Time Two, tasks which bore at best only a minimal relationship to their Time One responsibilities. Some confusion and duplication was the result, particularly as their new tasks tended to overlap with the normal responsibilities of maintenance personnel. Probably the single most important factor which accounts for the response of the engineers to the crisis at all was their definition of themselves as public employees and, among many of those engineers interviewed, as supervisors within the public works. Taken together, these two elements of their organizational affiliation demanded action of them in a public crisis, not as individuals, but as members of the city's public works department. That the supervisors were also mutual friends and normally worked in collaboration with one another very likely added to the imperative to act as a group.

Despite the strength of organizational and personal ties, the engineers suffered rather clearly from lack of coordination, not as much among themselves -- although even here there was duplication -- as with other divisions of the public works. Not until Sunday were activities of engineering inspection teams coordinated with activities of maintenance crews, and only then was the extent of duplication among engineering personnel clearly demonstrated. Confusion of this sort among organizations, according to Quarantelli, is one of the factors which produce Type IV groups. Confusion of this sort within a single organization may also contribute to the emergence of Type IV groups.

The Disaster Control Office may, in fact, be seen as a unit which mediated between the engineering and the maintenance sections of public works, although its formation was initially a partial consequence of the absence of a functional civil defense unit in Anchorage. As was suggested in chapter three and chapter four, the building construction and maintenance section (whose members formed the core of the Disaster Control Office) was largely maintenance-oriented, although structurally included in the engineering division. To that extent the section was ideally placed to emerge as a coordinating link between these two functional divisions. Headed by an engineer, its personnel were maintenance men whose normal responsibilities included the maintenance and repair of publicly owned buildings. As it first emerged, the Disaster Control Office was a search-and-rescue operation; but it soon took on other functions as well, one of which may be seen as an attempt to coordinate engineering and maintenance activities. Thus, in addition to its activities in securing damaged buildings, it also became something of an information center, bringing together data on the extent of the earthquake damage and areas of the city which had been inspected. Members of the Disaster Control Office emphasized that this function, like the others which they accepted, was attempted largely because of the absence of any other source of information.

The Time Two activities of the service and administrative section of the public works are less amenable to analysis in these terms. On the one hand, service personnel, like the water division's customer service section, took on new nonregular tasks which would suggest that they exemplify the characteristics ascribed to Type III groups. Interview data, however, indicate that they were absorbed by other divisions and sections of the public works and did not maintain their identity as a distinct group within the department. They did not, apparently, resume their normal tasks until some time after the disaster. No major changes in authority took place.

The customer service section, therefore, appears as a Type III group which virtually ceased to be a distinct group for some time after the earthquake. That its normal activities -- meter reading and the like -- were not only irrelevant but also impossible until the restoration process was complete probably accounts for its temporary extinction. However, this observation also suggests that perhaps the section members should not be visualized as a group at all, but simply as persons who participated in disaster activities as discrete individuals. That is, they could be viewed as volunteers who worked with public works only because of their greater familiarity with that organization. This happens to members of many complex organizations during large-scale emergencies. Their organization ceases to function as a unit; the members are thus freed to offer their services as volunteers for other groups.⁸ In the Anchorage Public Works Department, consequently, the members of the nonfunctioning customer service section might be seen as individual volunteers in functioning parts of the organization, rather than as persons shifting their organizational role. As was indicated earlier, they often worked apart from their usual co-workers and at tasks quite foreign to their normal routine.

This kind of explanation also seems applicable to the activities of members of the sanitation section. They likewise became attached to other groups but were engaged in tasks related to their Time One responsibilities. Normally, however, these tasks were not performed by sanitation personnel. Furthermore, by the end of the emergency period on Monday, members of this group had returned to their own section and to regular, although expanded, tasks. They were able to resume their routine schedules far earlier than could members of the customer service section.

Administrative personnel discussed in this monograph include both office employees, like the administrative assistant, clerks, and secretaries, and those who may be called "decision makers," like the director, his assistant, the public works superintendent, and his assistant. Office employees generally filled in wherever they were needed, returning to their normal tasks by the Monday following the earthquake. They did not constitute a separate unit within the public works and apparently acted as individual members of the organization whose new tasks were defined by the requirements of the situation and the instructions of those under whom they normally worked.

Similarly, it is probably unnatural to consider the decision makers in the public works as a distinct section. With the exception of the director,

whose responsibility was the entire organization, every member of the administration had charge of specific sections of the organization. Thus, the assistant director was less an administrator -- in the classic sense of that term -- than an engineer; the public works superintendent and his assistant were not really what their titles implied -- rather they were the superintendents of the maintenance division. Even the director of public works himself, as noted in chapter three, considered himself an engineer who was also an administrator, rather than the reverse.

If, as has been suggested in this report, the continuity or discontinuity of task priorities is reflected in the changes in organizational activities and authority relationships during an extreme situation, office personnel of the public works experienced a disaster -- a set of conditions which required that normal priorities and tasks be exchanged for new ones. Administrative personnel, on the other hand, as decision makers, did not engage in totally new tasks nor were their task priorities drastically revised. What did occur was a downward diffusion of authority to make decisions so that they shared their authority with members at lower levels of the organization.

Every analytical system used in the study of complex organizations must be flexible enough to take into account the peculiarities of a given organization. The principal purpose of this monograph has not been to test the validity of any particular scheme but to describe the response of one organization to one extreme situation. In the process of this description, two formulations were introduced. In this last chapter they have been defined and the extent to which they help understand the Anchorage Public Works Department data has been discussed. Specifically, this chapter has demonstrated how the typology of organizational response adds another dimension to the analysis of demands and capabilities. This dimension suggests where extreme situations may be expected to produce quantitative and qualitative changes in organizational tasks and authority.

The final words of this monograph -- in keeping with its primary purpose -- concern certain characteristics of the Anchorage Public Works Department as a unique organization. The following section is devoted to a discussion of its overall Time Two structure, the effect on its Time Two operations, its lack of a disaster plan, and certain qualities of its personnel in general.

The Anchorage Public Works Department: Conclusions

At several points in this monograph, it has been noted that the Anchorage Public Works Department impresses both observers and members of the organization as less a single, identifiable unit than a collection of loosely affiliated divisions and sections, each one of which operates more or less independently of the others and of the administration. The public works is, in fact, plural; it is a decentralized federation of parts rather than a centralized organization, even one with a relatively complex division of labor.

Administrative laissez-faire -- "I let my division heads operate as independently as possible" -- is the implicit policy of the organization. Division heads, as well as administrators, generally act on this basis. Separation of operational units in the public works began in Time One and in certain instances was accelerated by the organization's experience after the earthquake; this, too, constitutes evidence for the plurality of the organization. Thus, the water division and the building construction and maintenance section were created shortly before the earthquake; by the end of 1964, the divisions of traffic engineering and building inspection were completely autonomous, and the building construction and maintenance section was a separate division within the department.

During Time Two four operational units emerged which overlapped and consolidated certain elements of organizational structure which were officially discrete. These new units demonstrated the artificialities of some official distinctions.⁹ They also reflected the independence of many divisions and sections both from each other and from the administration. Most coherent of these Time Two units were two maintenance groups: streets and sewers on the one hand, and water (treatment plant and maintenance) on the other. Linked to the general maintenance section by the head of the construction section was a third unit of engineers, including the survey and design heads, some members of their sections, and a number of local architects and engineers from private firms. The fourth unit was the Disaster Control Office, directed by the head of the building construction and maintenance section and, in addition to extraorganizational personnel, including members of the building inspection division.

During the emergency period, members of other divisions and sections of the public works were either absorbed by these four units or were essentially inactive in departmental activities. Individual members of the water division's customer service section and the sanitation section took on new tasks with other groups. The division of traffic engineering was inoperative.

During Time Two, restoration and maintenance of essential services were the foci of public works operations; personnel, sections, or divisions which could not contribute to achieving these goals were outside the reorganized public works. It is an overstatement to say, as one public works employee put it, that

what really happened /to the public works/ was what happened to my . . . regiment /in the war/. First thing we did was lose all communication with our higher command. So we had ten or fifteen companies of infantry all operating as guerrilla companies.

However, this evaluation correctly suggests that plurality was a peculiar characteristic of the Anchorage Public Works Department and that this decentralization was revealed during Time Two in the number, composition, and activities of the units which emerged in the organization.

Disaster plans are one of the more important devices employed by organizations to promote efficiency and coordination in the event of extreme situations. Developed plans which have more than an existence on paper -- that is, plans which are used or, at least, rehearsed -- are likely to have a salutary effect on organizations under stress. The Anchorage Public Works Department, however, had no disaster plan. Among nonmaintenance personnel, if any one lesson was learned during the earthquake, it was that such a plan would have been useful: public works personnel were more likely to suggest the adoption of a disaster plan than any other change in the organization as a result of their earthquake experience.

Such a plan would have been most useful for engineering and office personnel. These members of the public works were least certain of their responsibilities during the crisis; definitions of tasks and authority appropriate to the disaster environment would have considerably improved the efficiency of these personnel. Certainly a viable plan would have reduced much of the duplication and confusion accompanying the early disaster activities of these personnel.

Maintenance divisions and sections of the public works, however, may be said to have a built-in plan for emergency operations.¹⁰ Insofar as meeting normal emergencies is a part of the Time One responsibilities of water, street, and sewer crews, these personnel possessed a well-rehearsed plan which was employed in coping with the more diffuse and damaging emergency. Task priorities and authority relationships had been previously established; most changes demanded by the earthquake were made within the context of these existing relationships. A more explicit emergency plan, however, might have increased the effectiveness of these crews' response to the earthquake, particularly as such a plan would have clarified the relationships and division of labor between maintenance and nonmaintenance personnel. As the plan existed, it tended to define emergency tasks and authority appropriate only for maintenance section personnel.

In addition to decentralization of public works administration and differences in disaster response of maintenance and engineering units, characteristics of certain individual members of the public works have been pointed out in the course of this monograph. Of these characteristics, the most important is length of employment, either in the public works or in other municipal agencies or local enterprises engaged in comparable or related activities. Such "old-timers" possessed information and skills particularly useful to the public works during Time Two. Their information and skills were especially important because employment turnover in Anchorage is generally high enough to preclude a large permanent base of experienced personnel, either in decision-making positions or on the line. Frequently, the first-hand knowledge of these "old-timers" compensated for the incomplete records of utility installations and the like. Restoration of service to public utilities, especially underground systems like sewers and water, would have been significantly delayed had the experience and knowledge of these "old-timers" been unavailable.

This monograph not only sought to add another case to the study of complex organizations -- although that was its principal purpose -- but also to demonstrate the usefulness of certain theoretical devices in the study of such organizations. To the extent that these devices help to predict from normal operations the activities of complex organizations in extreme situations, they have been useful implications for the total field of organizational research. It is hoped, too, that this analysis of the Anchorage Public Works Department adds to the knowledge of the field.

FOOTNOTES: Chapter VI

1. For a broader discussion of community priorities, see Daniel Yutzy with William A. Anderson and Russell R. Dynes, A Bad Good Friday: Community Priorities in the Anchorage, Alaska Earthquake, 1964, Disaster Research Center Monograph Series (Columbus: Disaster Research Center, The Ohio State University, 1969).
2. These expectations should not be taken as rigid formulations to be tested. Indeed, they are stated in a much more general form here than in the original papers. Their purpose in this context is simply to suggest the nature of the scheme and its relevance to the public works.
3. What results from this adaptation is, in Barton's words, the "emergency social system." See Allen H. Barton, Social Organization Under Stress: A Sociological Review of Disaster Studies (Washington: National Academy of Sciences-National Research Council, 1963).
4. Williams' distinction between "cultural structure" and "social organization" gives these emergency and disaster priorities a larger framework. Thus, emergency priorities reflect cultural definitions; disaster priorities reflect those rather more variable patterns of social organization. See Robin M. Williams, Jr., American Society: A Sociological Interpretation (2nd ed. rev.; New York: Alfred A. Knopf, 1963), pp. 193-194.
5. E. L. Quarantelli, "Organization Under Stress," Symposium on Emergency Operations, ed. by Robert C. Britton (Santa Monica: System Development Corporation, 1966), pp. 3-19; and Russell R. Dynes, Organized Behavior in Disaster: Analysis and Conceptualization, Disaster Research Center Monograph Series (Columbus: Disaster Research Center, The Ohio State University, 1969).
6. Quarantelli, "Organization Under Stress," p. 18.
7. Quarantelli, "Organization Under Stress," p. 10.
8. For a discussion of how the cessation of functioning of organizations during disasters frees their members for individual volunteer work in other groups, see Dynes, Organized Behavior, chap. vii.
9. Because these operational units emerged out of a somewhat atypical environment, the boundaries among them should not be taken as evidence of "national" cleavages. Although certain of the relationships which developed during Time Two were apparently based on functional ties which characterized normal environments as well, others of them appear to be products of the extremity of the situation. The distinction between emergency and disaster may be useful in separating one type from the other.

10. The impression of some DRC field staff has been that some Type I emergency organizations would be reluctant to call such a schedule a disaster plan. For police and fire departments, only emergencies exist, not disasters. The latter term, apparently, is taken as an indication that substantial doubts of the organization's capabilities exist.

APPENDIX

DESCRIPTION AND DIAGRAMS OF THE ANCHORAGE PUBLIC SAFETY BUILDING

The corridor of the Public Safety Building was inordinately crowded throughout most of the emergency period. Much work was done right at the police counter or in the corridor itself. Public officials mingled with the crowd and were hailed by runners. Diagram 1 shows the area as normally used; the utilization shown in Diagram 2 developed Saturday morning. City civil defense and search-and-rescue personnel were allocated office space then. The mayor and the manager were using the fire chief's office. The special missing persons group was established there on Sunday afternoon.

The desk in the corridor outside the Civil Defense office was placed there on Saturday. An MP was posted to keep the crowd from wandering into the offices. A girl at the desk was to provide information and screen those asking to see city officials. This block, while not very effective, did keep some of the crowd away. However, many persons came in through the side door at the entrance to the fire station.

On Saturday evening, The Salvation Army posted an officer at the desk shown in Diagram 2. They kept a representative there during the entire weekend.

The information desk was not placed in the main corridor (see Diagram 3) until Monday when two men were assigned to devise some way to post information about the activities in progress, the persons responsible, and how they could be contacted. These two eventually produced a number of large charts listing this information. The charts were posted in the main corridor behind the two desks there.

The volunteer desk was placed in the corridor on Saturday to register volunteer's skills, names, and addresses -- and to keep them away from the overcrowded corridor in the center section of the building. The food desk was provided by The Salvation Army and stocked with coffee, sandwiches, pastries, and milk. Early press conferences were held in the courtroom.

A mobile broadcasting studio was placed in position by 8:30 p.m. on Friday, and the Army field kitchen was set up on Saturday about 9:00 a.m. Both remained in position throughout the emergency.

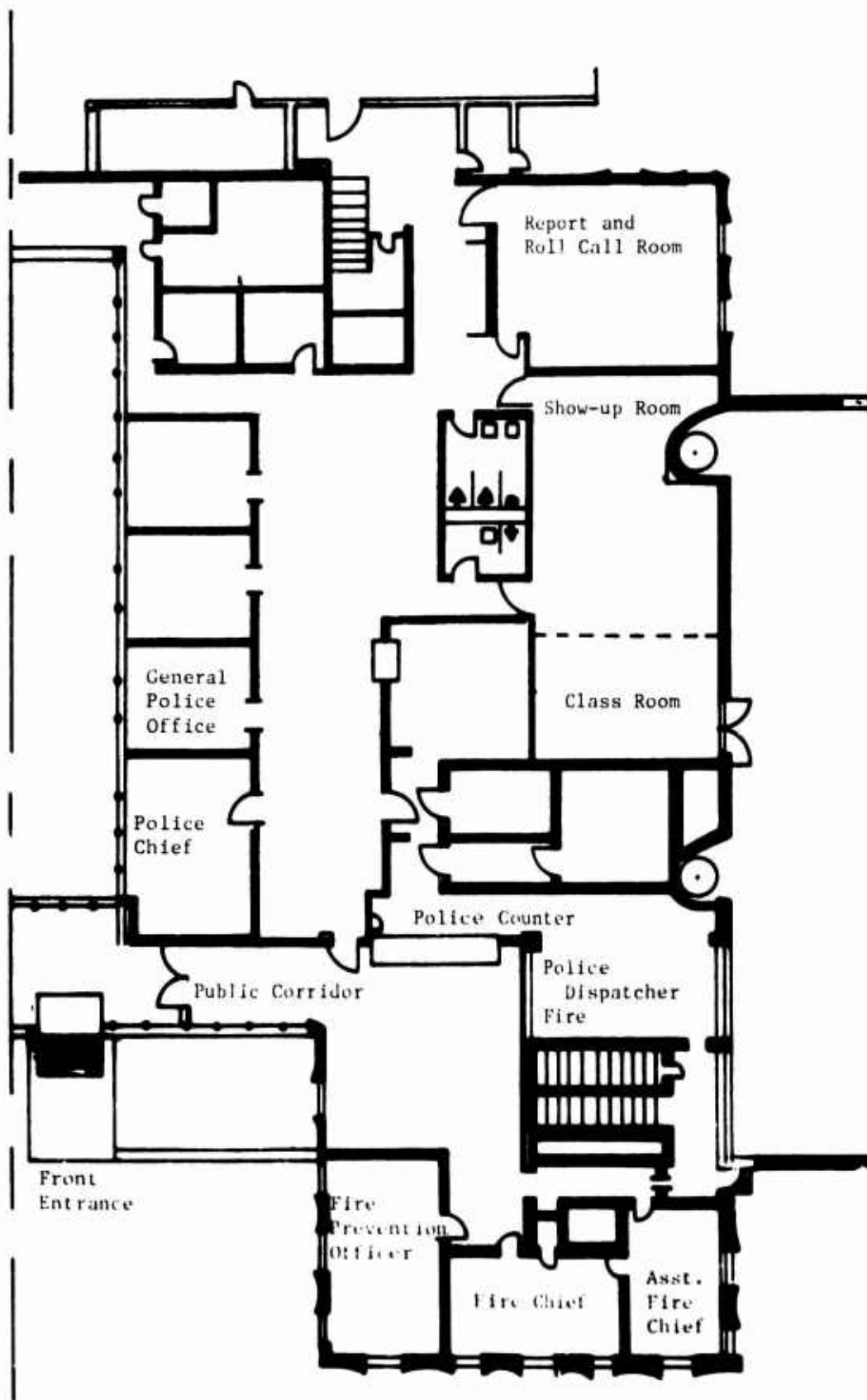


Diagram 1 - Anchorage Public Safety Building, Center Section:
Normal Distribution and Utilization

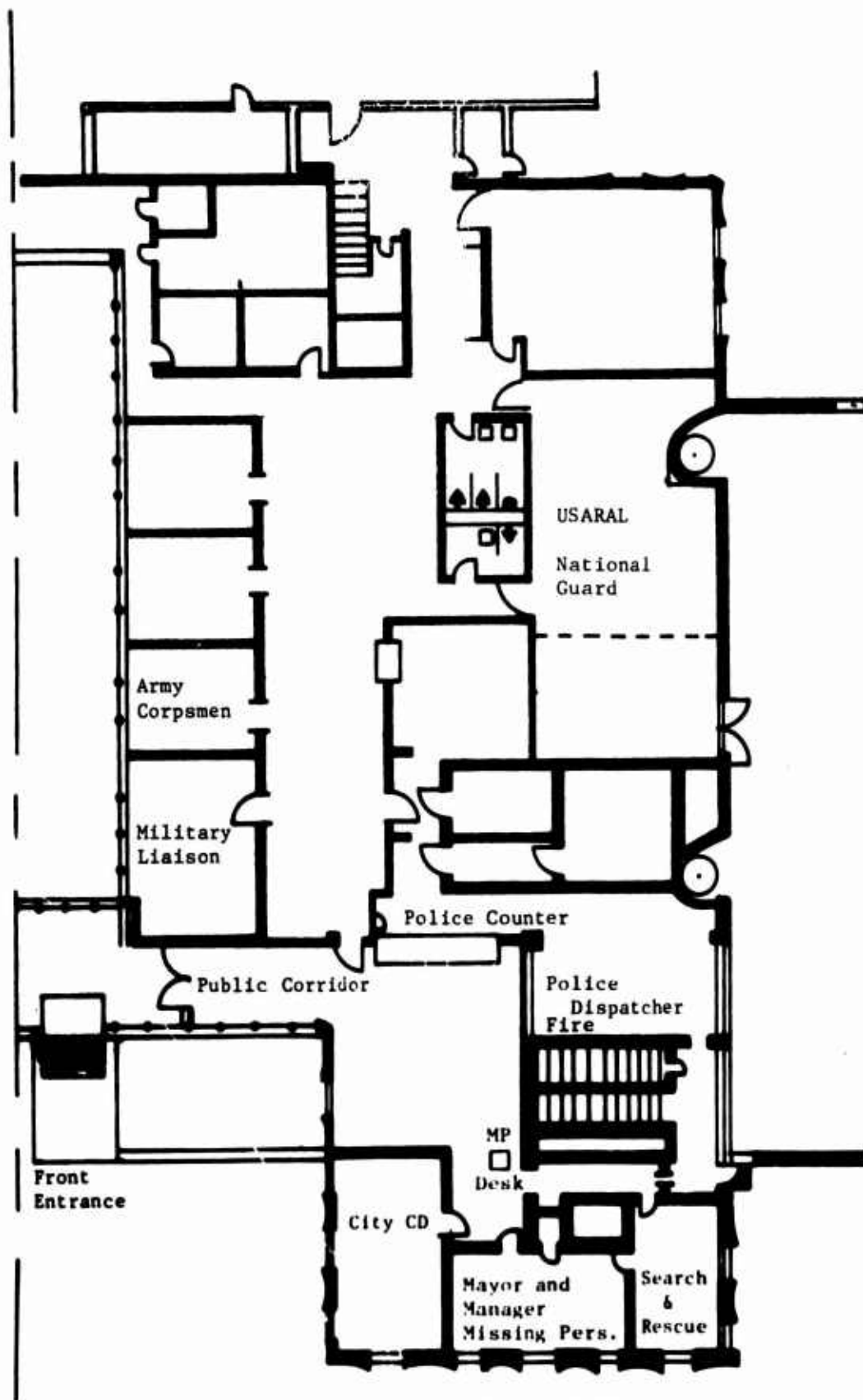


Diagram 2 - Anchorage Public Safety Building, Center Section:
Emergency Utilization

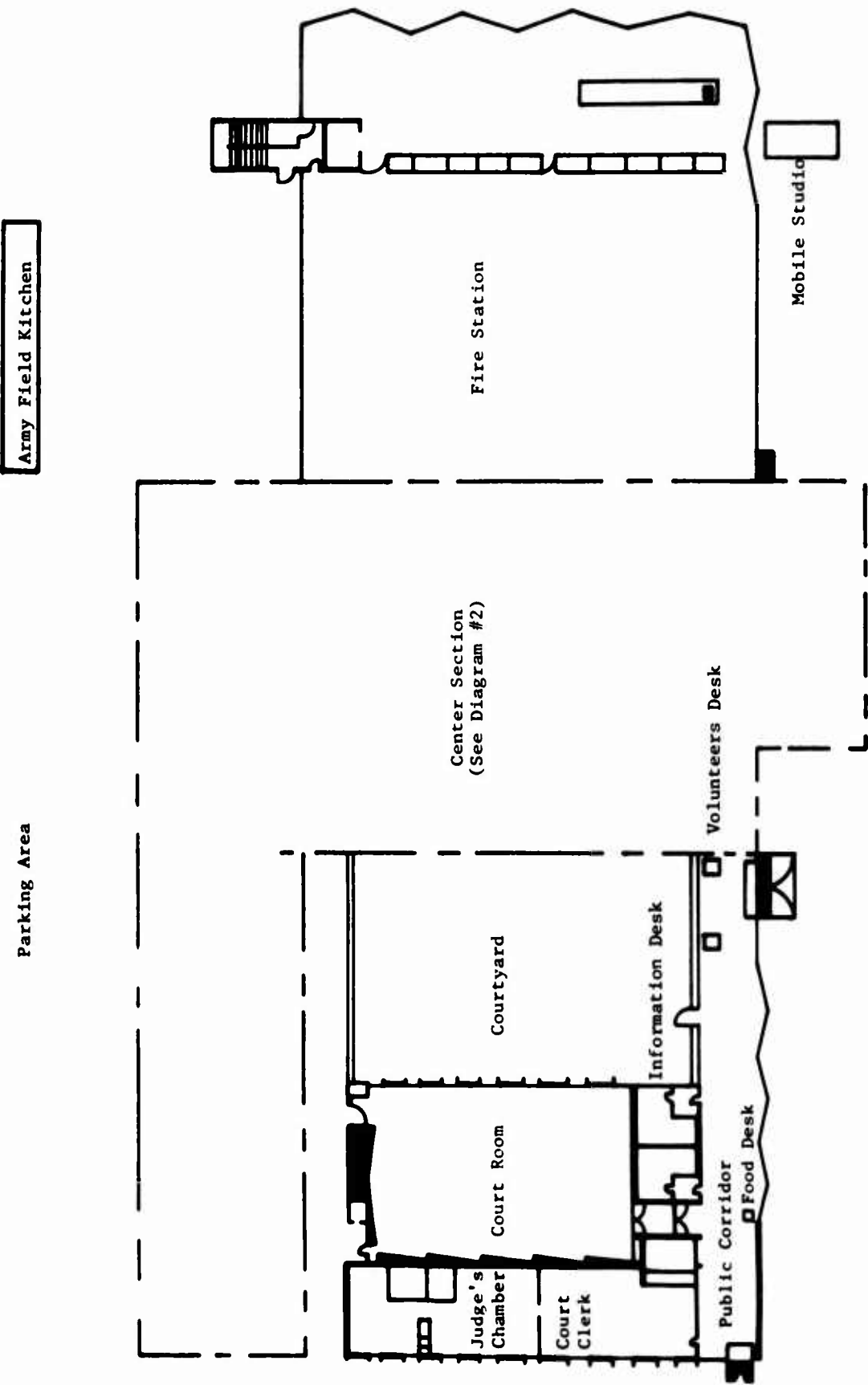


Diagram 3 - Anchorage Public Safety Building: Emergency Utilization

Emergency Actions and Disaster Reactions: An Analysis of the Anchorage Public Works Department in the 1964 Alaskan Earthquake. Disaster Research Center, The Ohio State University, Contract OCD-PS-64-46, Work Unit 2651-A, August 1969, 145 pp.

On March 27, 1964 Anchorage, Alaska was struck by an earthquake. The Disaster Research Center studied the response of various community organizations to disaster. A major part of this study was the disaster response of the Anchorage Public Works Department, the municipal agency most involved in meeting emergency demands. The analysis suggests that the behavior of the members of the department may be characterized as emergency actions and disaster reactions. The distribution of operational problems in tasks, authority, decision making, and communications are related to this distinction between emergency actions and disaster reactions.

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THE DISASTER RESEARCH CENTER

The Disaster Research Center (DRC), a part of the Department of Sociology at The Ohio State University, was organized in 1963. The Center is engaged in the scientific study of individual, group, organizational, and societal responses to community-wide disasters and other extreme stress situations. Major focus of the research is placed on obtaining an extensive and detailed picture of the human and social problems generated by these events, and how they are solved by affected persons, communities, and societies. The Center conducts field studies both in this country and overseas. Part of the research of the Center also involves the laboratory study of groups under stress.

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13. ABSTRACT On March 27, 1964 Anchorage, Alaska was struck by an earthquake. Buildings and streets were damaged and essential water and sewer services disrupted. Within 27 hours of the impact a Disaster Research Center field team was dispatched to Anchorage to begin a study of the response of various community organizations to the disaster, a study which required 6 separate field trips and was concluded in the fall of 1965. A major part of this longitudinal study concerned the disaster responses of the Anchorage Public Works Department, the municipal agency most involved in meeting the emergency demands. Sixty in-depth interviews were conducted with members of this department. This monograph summarizes and analyzes this interview data. Additional written material supplements this data. The analysis employs two analytical schemes developed at DRC. One provides a framework for comparing organizational behavior during "normal" time (Time One) and emergency (Time Two) operations. The other scheme distinguishes among four types of organizations comparing them by their structure and tasks. The analysis suggests that the behavior of members of the Anchorage Public Works Department during the emergency may usefully be characterized as emergency actions and disaster reactions. Members of maintenance divisions acted in terms of their standard emergency procedures; members of engineering divisions on the other hand, reacted to a unique and discontinuous event. They were required to improvise much of their response to the disaster, this improvisation being most clearly demonstrated in the Time Two emergence of a new engineering group within the public works department. The distribution of Time Two operational problems in tasks, authority, decision making, and communications are related to this distinction between emergency actions and disaster reactions.		

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